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Senate Hearings

Before the Committee on Appropriations

Department of Defense Appropriations

92d CONGRESS, SECOND SESSION

Fiscal Year 1973

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Part 3 DEPARTMENT OF THE NAVY

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DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1973

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS UNITED STATES SENATE

NINETY-SECOND CONGRESS

SECOND SESSION

ON

H.R. _____

AN ACT MAKING APPROPRIATIONS FOR THE DEPARTMENT OF DEFENSE FOR THE FISCAL YEAR ENDING JUNE 30, 1973, AND FOR OTHER PURPOSES

Printed for the use of the Committee on Appropriations

PART 3

U.S. GOVERNMENT PRINTING OFFICE
78-659 O WASHINGTON : 1972

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[1] Deceased, July 27, 1972.
[2] Appointed, Aug. 10, 1972.

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1973

WEDNESDAY, FEBRUARY 23, 1972

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee met at 10 a.m., in room S–126, the Capitol, Hon. Allen J. Ellender (chairman) presiding.

Present: Senators Ellender, Pastore, Young, Allott, and Case.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE NAVY

STATEMENT OF HON. JOHN H. CHAFEE, SECRETARY OF THE NAVY

ACCOMPANIED BY:

ADM. ELMO R. ZUMWALT, JR., USN, CHIEF OF NAVAL OPERATIONS
GEN. ROBERT E. CUSHMAN, JR., USMC, COMMANDANT OF THE MARINE CORPS
FRANK SANDERS, ASSISTANT SECRETARY OF THE NAVY (FINANCIAL MANAGEMENT)
REAR ADM. SAM H. MOORE, USN, DIRECTOR OF BUDGET AND REPORTS, OFFICE OF THE NAVY COMPTROLLER
BRIG. GEN. C. S. ROBERTSON, USMC, DEPUTY FISCAL DIRECTOR, HQMC
BRIG. GEN. E. R. REID, JR., USMC, LEGISLATIVE ASSISTANT, HQMC
CAPT. JOHN M. DeLARGY, USN, CONGRESSIONAL AND POLICY COORDINATION BRANCH, OPNAV
CAPT. ROBERT S. HAYES, USN, OFFICE OF PROGRAM APPRAISAL
CAPT. H. B. ROBERTSON, JR., USN, SPECIAL ASSISTANT TO CNO
CAPT. T. HANSON, USN, THE EXECUTIVE ASSISTANT AND NAVAL AIDE TO SECRETARY OF THE NAVY
CMDR. J. C. WINSLETT, JR., USN, CONGRESSIONAL COORDINATION SECTION, OPNAV
LT. COL. J. N. SMITH, USMC, POLICY ANALYSIS, HQMC
CAPT. G. H. SEYMOUR, USN, OFFICE OF THE COMPTROLLER OF THE NAVY
CAPT. J. L. WOODBURY, USN, OFFICE OF THE COMPTROLLER OF THE NAVY
MAJ. R. T. PACE, USMC, OFFICE OF THE COMPTROLLER OF THE NAVY
D. C. SINCLAIR, OFFICE OF THE SECRETARY OF DEFENSE (COMPTROLLER)

BUDGET REQUEST

Chairman ELLENDER. The subcommittee will please come to order.

Today, the Defense Appropriations Subcommittee will hear testimony from the Secretary of the Navy, the Honorable John H. Chafee; the Chief of Naval Operations, Adm. Elmo R. Zumwalt, Jr.; and the Commandant of the Marine Corps, Gen. Robert E. Cushman, Jr.

We are happy to have you with us, gentlemen.

Appropriation requests for the Department of the Navy, for fiscal year 1973 total $25,096,954,000, which is comparable to the fiscal year 1972 appropriations of $23,278,252,000, and which includes pending supplementals totaling $807,457,000.

(Editor's Note: The total Navy budget request were increased to $25,160,754,000 by the President's Budget Amendment of March 29, 1972 (H. Doc. 92-272). Based on final action the fiscal 1972 supplemental requests, the fiscal 1972 appropriations total $23,176,195,000.)

Chairman ELLENDER. The fiscal year 1973 requests by appropriation title are as follows:

Military personnel, Navy	$5,352,749,000
Military personnel, Marine Corps	1,537,792,000
Reserve personnel, Navy	230,640,000
Reserve personnel, Marine Corps	78,155,000
Operation and maintenance, Navy	5,134,568,000
Operation and maintenance, Marine Corps	383,263,000
Procurement of aircraft and missiles	3,871,200,000
Shipbuilding and conversion	3,564,300,000
Other procurement	2,023,200,000
Procurement, Marine Corps	191,100,000
Research, development, test and evaluation	[1] 2,793,787,000

[1] Includes $63,800,000 requested in the President's budget amendment of Mar. 29, 1972 (H. Doc. 92-272).

PREPARED STATEMENT

Chairman ELLENDER. You may proceed, Mr. Secretary.

Secretary CHAFEE. Mr. Chairman, I thought that I would, as I did last year, submit a statement to you for the record. In addition I have a few slides to show you which I thought would explain the situation rather briefly and state our case.

(The statement follows:)

SECRETARY OF THE NAVY FISCAL YEAR 1973 PROGRAM AND BUDGET STATEMENT

I. INTRODUCTION

This being my fourth year before this committee, I believe it useful to present the Department of the Navy's fiscal year 1973 program and budget in the context of what has transpired during my tenure as Secretary of the Navy and what I foresee in the future. First, I would like to restate what our major objectives have been during the past three years and review our progress toward achieving these objectives. Then I will discuss some continuing problems and future concerns. Finally, I will explain how our fiscal year 1973 budget is intended to continue the Department's progress toward the objectives which we have been pursuing. Many of the issues that I addressed last year are still with us. Nonetheless, a year provides us a fresh look at the recent past and a new look into the future.

When I took office in January 1969, the United States was heavily committed in Vietnam. This effort had first call on our talent and resources during 1969, and to a lesser extent in 1970 and 1971 as we quickened our withdrawal. Our latest ships and most modern aircraft were being sent to this theatre. The

Marine Corps had over 25 percent of its personnel deployed in Vietnam and the Navy was assigning thousands of its best young officers and enlisted men in-country billets. Seventh Fleet ships and aircraft had top priority in the Navy for not only the latest weapons, but also for people and for logistic support, at the expense of all other naval units including those of the Sixth Fleet. The Vietnam war has had an adverse impact on the overall readiness, modernization rate, and retention of military personnel in the Navy and Marine Corps. Our weapons stockpiles were reduced, shipbuilding and aircraft procurement programs were slowed, overhauls and maintenance were deferred, and many of our officers and men were subjected to repeated tours in combat and prolonged absences from their families.

II. OBJECTIVES AND ACCOMPLISHMENTS

To support the national security strategy of Realistic Deterrence, which Secretary Laird enunciated last year, we determined a number of objectives for the Department which I would now like to discuss.

Our first objective has been to contribute most effectively to the goals of Vietnamization and end American involvement in Southeast Asia at the most rapid pace possible. Simultaneously we have pursued the following four additional objectives:

Improvement of the operation and materiel readiness of Navy and Marine Corps forces, with special emphasis on units deployed overseas.

Modernization of Navy and Marine Corps weapons systems.

Effecting more efficient and cost conscious management of our resources.

Improvement of recruiting and retention of high quality military personnel in the Navy and Marine Corps, in support of the National goal of achieving an all volunteer force by July 1973.

I would like now to review our progress in the past three years toward achieving each of these five objectives.

Southeast Asia Withdrawal and Vietnamization.—Our most important objective in South Vietnam has been and remains to help that country attain a reasonable chance for self-determination. Our efforts in meeting the overall Vietnamization timetable have continued with great success during these three years. As of 1 January 1972 all but 500 Marines had been withdrawn and only 8,000 Navy personnel were still in-country. As a result of the President's announcement, we plan a substantial reduction in the Navy numbers by 1 May 1972. The South Vietnamese Navy (VNN) has completed its buildup to approximately 40,700 personnel and their Marine Corps to about 13,900. To date we have turned over 685 combatants and 290 harbor, logistic, and mine craft to bring the VNN inventory to a total of about 1,600 ships and craft. We have formed, equipped, and trained a Vietnamese Marine Corps Division. During my visit to Vietnam in January of this year, I was greatly impressed with our progress in Vietnamization and encouraged by the demonstrated effectiveness of the South Vietnam naval forces.

Improved Operational and Materiel Readiness of Navy and Marine Corps Units.—While the combat readiness of our forces in Southeast Asia was very high in 1968, our Navy and Marine forces in other parts of the world were deficient in many aspects of readiness. The decision to withdraw from SEASIA, accompanied by the growing Soviet presence on the world's oceans required a reappraisal and revision of the distribution of marginally low materiel and personnel resources. This was the factor spurring our second major objective for increasing the operational and materiel readiness of our forces worldwide. Our efforts continue to be devoted to the task of achieving maximum readiness, not only for strategic forces and the forward deployed Sixth and Seventh Fleets, but also for our forces deployed around the United States.

The following are areas where we have improved our readiness for combat:

The conversion of ten Polaris submarines to Poseidon has been successfully completed and seven are now on patrol or have completed patrols. Nine more submarines are in the shipyard now undergoing conversion. The Poseidon missile, as you know, carries a MIRV payload with [deleted] independently targetable reentry vehicles. In the system demonstration firings, [deleted] of [deleted] missiles fired from Poseidon submarines have been successful.

Improved readiness of the Sixth Fleet. By deploying to the Mediterranean for the first time an Amphibious Assault Ship (LPH) with Marine helicopters embarked, we have enhanced the Sixth Fleet Marine capability to land by air

as well as over the beach. The number of nuclear attack submarines deployed to the Mediterranean is being increased to improve the Fleet's capabilities for covert surveillance and anti-submarine warfare. This fleet was augmented by two gunboats (PGs) for trailing Soviet warships which could threaten our fleet. We have deployed three escort ships (DEs) with the specific mission of anti-submarine surveillance using the newly developed interim towed array surveillance system (ITASS). Very promising results to date have prompted us to procure improved systems for further evaluation. To the maximum extent possible, we installed a variety of our latest electronic warfare devices in Sixth Fleet ships and aircraft including secure voice communications capability. Sixth Fleet carrier air wings were provided our most modern aircraft. Finally, the logistic support system from Conus was streamlined for quicker service, and shore based support in the Mediterranean was strengthened.

The Marine Corps has resumed its 1964 posture in Westpac with the Third Marine Amphibious Force, composed of a division (minus) and an aircraft wing, based in Okinawa and Japan. It is a fully ready force. Units from this force are continuously embarked in amphibious shipping of the Seventh Fleet.

During the past three years, 28 of the 35 Naval Reserve Force destroyers and destroyer escorts have been replaced by more capable ships which became available due to reductions in the active fleet. The total number of Naval Reserve Force ships of all types increased from 49 to 58. Improvements also took place in our Naval Air Reserve Programs.

I would be less than candid if I gave you the impression that we are satisfied with the operational and materiel readiness of our present forces. We have experienced a rapid turnover of key maintenance and operational personnel during the past two years. Adding to the turbulence were a number of ship retirements, new ships joining the fleet, and reduction in the size of the naval forces. This personnel turbulence combined with the long training period required to produce qualified technicians, has been the major cause of many materiel deficiencies. At the same time our equipment has grown more sophisticated and the logistic support for spare parts remains a problem.

Modernization of Weapons Systems.—Readiness is the capability of combat units to carry out their missions—modernization is the key to future readiness. The finest personnel in the world, though superbly trained and highly motivated, are at a great disadvantage against an adversary equipped with markedly superior weapons systems. Operational readiness in the late 70's and the remainder of this century is dependent in large measure upon our present modernization efforts.

During the period 1 July 1969 to 1 July 1972, 108 new ships will have entered our active inventories. We now have 80 ships ordered or being built. Most notable among these are the nuclear-powered aircraft carriers *Nimitz* and *Eisenhower*, 12 nuclear attack submarines of the new *Los Angeles* (SSN 688) Class, 16 *Spruance* (DD 963) Class destroyers, five amphibious assault ships (LHA), and five nuclear-powered frigates including *California* and *South Carolina*. Thus, by retiring older ships and bringing in new ships, we are in certain cases reducing the average age of our ships and at the same time increasing unit capability. Even so, the number of forces have declined rapidly and with them our flexibility to meet worldwide commitments.

With regard to aircraft, we are bringing into our inventory a number of vastly improved airplanes. Examples of these are the PC–3 land-based anti-submarine airplanes, the S–3A carrier-based anti-submarine airplanes, the AV–8A V/STOL and A–4M for the Marines, and carrier-based F–14 fighters, EA–6B electronic warfare aircraft, E–2C early warning aircraft, and A–6E/A–7E attack airplanes. Additionally, we are procuring the latest helicopter gunships for the Marines and some improved training aircraft. As in the procurement of ships we are fiscally constrained to insufficient quantities of new aircraft for a one for one replacement of older models. Within several years this deficit will also adversely affect the readiness of our Reserve Air Wings and Groups. However, as noted, improved unit capability compensates at least in part for this numerical deficiency.

While numerically our amphibious ship forces have been halved during the past three years, we have achieved a much more modern amphibious force through a combination of retirements and new ship construction. In fiscal year 1973, for the first time, all our amphibious ships will be capable of 20 knot speeds, all will have a helo platform capable of accommodating the Marines' largest helicopter (CH–53), and the average ship age will be about

seven years. However, the total number of ships is barely adequate to support the current requirements.

Likewise, there has been considerable improvement in our weapons posture. In the anti-submarine warfare area we now have the MK–48 long-range, high-speed, deep diving, command-guided, terminal homing torpedo in production. In spite of a slow start in the MK–48 program, it is now on schedule, and we are confident that this weapon system will live up to our expectations. We expect initial fleet introduction soon. The MK–48 will greatly enhance our submarine's capability to counter hostile surface ships and submarines.

For anti-air warfare, including anti-ship missile defense (ASMD), we have purchased 80 Basic Point Defense Missile Systems, and are accelerating their installation in selected carriers, amphibious ships, and escort ships.

For air-to-air warfare we now have the Phoenix missile in production. It is a long range sophisticated weapon which potentially gives the F–14 fighter a very significant capability against multiple raids of hostile aircraft at great distance.

For surface-to-surface warfare we are increasing the usefulness of Standard missile, now installed on most of our guided missile ships, to make it capable of [deleted] attacks on surface targets. Further, this missile will be added to a number of escort ships.

In amphibious warfare a new family of amphibious tractors (LVTP–7s) to speed the ship-shore movement in amphibious operations will enter the inventory in March 1972. All Fleet Marine Forces will be equipped with the new vehicles by the end of fiscal year 1974.

We also have a number of modern weapons systems in development, which should be available in the next 2–5 years. These include Nato-Seasparrow, Lamps, Harpoon, Captor, Condor and Vulcan/Phalanx. Details of these and other systems will be presented in later briefings by Navy and Marine Corps witnesses.

More Efficient Management of Resources.—A number of actions have been taken in recent years that I consider have improved the management of resources within the Department of the Navy. These include:

Increased emphasis has been placed on management of personnel. We have created a new organization to deal with human relations, reorganized our recruiting establishment, reorganized and relocated our training management staff and instituted improvements in the management structure of the Naval Reserve.

Steps are being taken to combat drug abuse by education and information, recruit screening, law enforcement, and rehabilitation. Increased command awareness together with the introduction of urine screening, first with all Navy and Marine Corps personnel leaving Vietnam, and more recently with all recruits, as well as personnel stationed in certain overseas areas, have led to an increase in drug-identified persons. This screening is being expanded and it is planned that all personnel will be tested at least once a year. Two Naval Drug Rehabilitation Centers are now in operation, one in Jacksonville, Florida, and one in Miramar, California. Treatment and counseling, tailored as nearly as possible to the needs of the individuals, are provided at these centers.

Specific steps are being taken to improve race relations in both the Navy and the Marine Corps, to ensure equal promotion opportunities for minority groups, and to emphasize recruiting of minority groups, particularly blacks. The Navy and the Marine Corps have no preferred route to advancement other than superior performance in responsible assignments. In recent years all identifiable institutional barriers to assignments and promotions have been removed, and special efforts are made to encourage minority group personnel to take advantage of the opportunities now afforded. NROTC Units were established this past year at predominantly black Savannah State College and Southern University. Filipinos are now eligible for all open ratings. The Navy has also made a concerted effort to maintain contact with minority organizations and minority media.

Measures have been taken to reduce cost, schedule and performance variances in the acquisition of major weapon systems. The GAO examination of selected major weapon systems revealed a number of weaknesses, as did the Blue Ribbon Defense Panel a year and a half ago. Although complete solution of all problems in these areas has not yet been possible, a number of specific actions have been taken to control them. These actions include:

(1) A general improvement in our cost estimating capability.

(2) Improvements in the selection, training, and rotation of program manage-

ment personnel and a general upgrading of the program management function in terms of career potential.

(3) Controlling changes by various contracting techniques such as "price thresholds", and a new family of contract clauses designed to provide better control over program changes.

(4) Minimizing risk by ensuring that fall back options are available in high risk areas, making greater use of actual performance testing, and instituting contractual techniques such as milestone contracting and use of flexible delivery schedule for government furnished equipment.

(5) Improving Navy contract administration capability.

(6) Increased stress on test and evaluation of new weapon systems before committing them to the fleet.

Our prototyping program is moving ahead. In order to fulfill our promise to the Congress to proceed with a definitive program by early spring, we have issued three Letters of Interest to focus the attention of industry on programs which should be fruitful. They include ASW Sensors, weaponizing of ships, and V/STOL aircraft. We plan to continue the process of Letters of Interest as a means of stimulating ingenuity in filling technological gaps.

Finally, hard choices are being made in curtailing or cancelling certain weapons systems. For example, I decided last year that we could not afford to include additional DLGNs in our fiscal year 1973 budget because of the urgent need to procure other ships, including underway replenishment, support, and small combatant types, for a balanced, modern Navy.

Retention of Personnel.—As you may recall, last year I cited retention of high quality personnel as one of our major challenges. It still is. Higher retention is mandatory if we are to increase readiness and achieve an all volunteer force. Our latest figures show definite improvement in both Navy and Marine Corps retention. Much of the credit must undoubtedly be given to the recent pay raises enacted by Congress although we have not had time to assess their full impact. In addition, the special attention which has been given to this problem by the Chief of Naval Operations and the Commandant of the Marine Corps has undoubtedly had a pronounced effect.

Our Navy first term reenlistment rate for fiscal year 1971 was 17 percent. The cumulative experience from July through December of 1971 was 21 percent, and we expect further improvement. The Marine Corps first term reenlistment rate also rose from 7.9 percent in fiscal year 1971 to a current rate of about 11 percent. A general trend of improvement has also been noted in Navy and Marine Corps officer retention. However, we are still short of our objectives for first term Navy and Marine Corps enlisted and all categories of Navy officers. It is still too early to determine if our efforts will succeed as the Defense Department moves toward the objective of an all volunteer force. You can appreciate that there is no single personnel program which is going to do the job. The following are some of the initiatives which have been undertaken to make service life more attractive for members of the Navy, Marines, and their dependents:

1. Reduced separation from families by reduction in the tempo of peacetime operations, overseas homeporting to reduce rotational deployments, and less stringent in port duty assignments.

2. Improved conditions of service life with more attention given to the needs of the individual.

3. Improved opportunities for minority groups.

4. Improved ratios of enlisted sea/shore rotation, with the objective of eventually providing three years of shore duty for every three years at sea.

5. Increased emphasis on bachelor housing. The fiscal year 1973 program continues my efforts of the past three years to improve bachelor housing and messing facilities. It will provide some 27,000 new or rehabilitated spaces at a cost of about one-fifth of our military construction budget.

6. Increased family housing. For the past three years our approved and funded new construction totaled 9,904 units. To increase our share of the fiscal year 1973 program we have, as in the past two years, transferred to the housing program $20 million of our preliminary fiscal year 1973 budget. The DOD program for the Navy and Marine Corps provides in fiscal year 1973 for 4,600 new family units.

7. The Junior College Program, which gives outstanding petty and non-commissioned officers an opportunity to achieve an associate (2 year) degree, is being expanded.

8. Increased concern for dependents through more efficient medical and other services. We have built 900 temporary housing units at 13 locations under the Navy Lodge Program which is intended to ease the financial burden on our transient personnel.

Fiscal year 1973 will be a particularly heavy turnover year for Navy enlisted personnel, resulting from the high input level of enlistments in fiscal year 1969. For that reason it will be particularly important to sustain the upward trend in our improved retention rate. In anticipation of this we are making special efforts to provide the incentives and the satisfactory work and living conditions which will be conducive to better retention. Without the motivation of the draft, I am especially concerned about our ability to enlist and retain the quantity and quality of people we need in the Naval and Marine Corps Reserve. We are upgrading our recruiting organization and may well require an appealing new incentive package in order to attract able people to the reserve forces.

III. CONTINUING PROBLEMS AND FUTURE CONCERNS

Although we have made progress during the past three years toward achieving our broad objectives, I must point out some problems that I foresee.

The increasing cost of modern weapons systems. We are resisting the trend to greater complexity and sophistication but much is dictated by the nature of the threat and a prudent level of response. This is forcing us to a mix of a few sophisticated ships and many less capable, but adequate ships. We have a similar problem in procuring adequate numbers of modern aircraft. We are placing strong emphasis, however, on high quality, more reliable systems that will hopefully result in an overall improvement in fleet readiness.

Adjusting our shore establishment facilities and support to the needs of reduced forces. The percentage of the Department of the Navy budget devoted to support has been rising. We have made some cuts in the past two years, but so many of our cuts in manpower were horizontal that overhead costs have become disproportionate.

Diminishing number of U.S.-flag merchant ships compatible with military unit equipment and available for the rapid deployment concept required by our national strategy. The only immediate capability available to DOD is the Military Sealift Command's (MSC) Controlled Fleet, consisting of the government owned nucleus fleet and the chartered commercial ships. The major problem confronting MSC is in the area of modern oceangoing cargo ships. Except for two Roll on/Roll off ships and one break-bulk ship, the balance of the nucleus fleet, 23 cargo ships, are of World War II construction.

Funding adequate environmental protection programs. The Navy is committed to taking a lead in preserving and improving the quality of our environment. Over the past five years we have received from the Congress over $160 million for air and water pollution abatement, and the final costs will run well over a billion dollars. The impact of pollution abatement is peaking at naval shore activities, but is just beginning for mobile units such as our ships and aircraft. Within this budget are funds to essentially solve the shore-based pollution problems, except for deferrals authorized where standards have not been promulgated, technology is not available, or time is required to allow time-phasing with a municipal system.

There will be an initial effort at shore activities to support our ships by installation of pier sewers to receive ship's waste water. We will also begin installation of collection, holding, and transfer systems on selected ships being overhauled in fiscal year 1973. There has been research and development effort underway for several years to develop a marine sanitation device. Five units developed by U.S. industry are currently under evaluation, and this effort continues. We will begin installation in fiscal year 1973 of oil control systems on our ships to reduce accidental oil spills. The Navy is rapidly developing facilities and expertise for clean-up of oil spills that do occur.

Perhaps the most serious concern regarding the future is related to the rapidly increasing capabilities of the naval forces and the maritime fleet of the Soviet Union. The growth of Soviet seapower in its broadest sense and their increasing worldwide activity are factors which we cannot control. The Soviet's capability to exploit the use of the seas and to limit ours is growing. Admiral Zumwalt will provide his assessment of the threat in much greater detail. Nevertheless, I should like to express briefly some thoughts I have in regard to this serious problem.

The Soviet Navy has evolved impressively in both size and capability supported by a strong technological and industrial base. What does this Soviet naval capability mean to us? I think the Soviet Navy's increasing worldwide presence and growing deployments into the Mediterranean Sea, the Indian Ocean, the North Atlantic, the Central Pacific, and Caribbean have clear political as well as military implications. The problem of developing adequate naval forces to counterbalance Soviet naval forces as well as to discharge the responsibilities of our national strategy is a continuing challenge.

As you know the Soviets have more attack submarines than we do and they are building at the rate of six to nine a year. They are reducing the advantages we have in quality by building new, quieter classes of submarines. In the past four years, the Soviets have introduced at least [deleted] new designs in submarines. [Deleted.] Beyond this they have given high priority to Yankee-class ballistic missile submarines, and are currently building them at a rate of up to nine a year.

Another grave threat is posed by the anti-ship missile capability of the Soviet naval air forces, surface forces, and submarines. The potential of Soviet naval aircraft in this role has been enhanced by the addition of new missiles and the development of the new Backfire swing wing bomber with greatly increased range and speed. Numerous surface ships, both large and small, and several classes of Soviet submarines, including the new Charlie [deleted,] carry highly effective anti-ship missiles which pose a great threat to our surface navy and to U.S. and allied merchant shipping.

IV. FISCAL YEAR 1973 BUDGET AND PROGRAM OF DEPARTMENT OF THE NAVY

I would now like to provide you an overview of the actual fiscal year 1973 Budget for the Department of the Navy and relate it to the five major objectives which I cited earlier. The President's fiscal year 1973 Budget provides $25.67 billion TOA for the Department of the Navy, including $23.48 billion for the Navy and $2.19 billion for the Marine Corps. These funds will permit support in fiscal year 1973 of:

602,000 Navy and 198,000 Marine personnel on active duty and 329,000 civilian personnel. A Naval Reserve drill pay level of 129,000 and a Marine Corps Organized Reserve of 45,000.

Sixteen aircraft carriers, 14 CV/CVA and 2 CVS, with associated attack and ASW carrier squadrons.

A total of 242 missile cruisers, frigates, destroyers and escorts, of which 72 are missile ships and 4 are nuclear-powered.

41 fleet ballistic missile submarines of which 20 will have been converted to carry the Poseidon missile by the end of fiscal year 1973.

60 nuclear and 27 conventionally powered attack submarines.

3 Marine Divisions and 3 Marine Aircraft Wings and supporting forces.

66 amphibious ships, providing a lift capability for the assault elements of slightly more than one Marine Amphibious Force.

Counting underway replenishment and other supporting ships, a 594 ship active Fleet and 58 Naval Reserve Force Ships.

A total of 6,818 Navy and Marine Corps active aircraft including those assigned to the Navy and Marine Reserve aircraft squadrons.

Major Procurement Programs.—For modernization and improvement of our capability, approval of the fiscal year 1973 request would permit us to:

Build 20 new ships: 6 SSN–688 class nuclear-powered attack submarines, 7 DD–963 class destroyers, 2 patrol hydrofoil missile ships (PHM), 1 new patrol frigate (PF), and 4 support ships.

Buy long lead items for a fourth nuclear-powered carrier.

Convert 6 fleet ballistic missile submarines to the Poseidon missile, 2 guided missile frigates to a modern anti-air warfare suite, and 1 submarine tender to support the Poseidon weapon system.

Accelerate the development of the Underseas Long-Range Missile System (ULMS). This development will proceed at a faster pace than envisioned in last year's budget in order to be able to achieve an earlier operational status in the Fleet.

Procurement of the MK–48 torpedo to provide our submarines with a capability of killing any high speed, deep diving enemy submarine.

Buy a total of 282 aircraft as follows:

12 A–6E and 24 A–7E attack planes; 7 EA–6B electronic warfare aircraft; 30 AV–8A V/STOL attack aircraft; 48 F–14 fighters; 8 E–2C early warning aircraft; 24 P–3C patrol planes and 42 S–3A aircraft for antisubmarine warfare; 24 T–2C trainers; 24 UH–1N helicopters and 20 AH–1J helicopter gunships; 8 new transports; 5 LC–130R aircraft for Operation Deep Freeze and 6 VH–53 helicopters for executive lift.

Complete the purchase of the new family of amphibious vehicles for the Marines and provide them with new communications equipment.

There are a few major programs in this year's statement which I would like to describe briefly and indicate my views on the degree of urgency:

LHA and DD 963.—Two of our largest current shipbuilding contracts are with Litton Industries: the LHA amphibious assault ships and the DD 963 class destroyers. Litton is commencing to build these ships in a huge new shipyard of advanced design in Pascagoula, Mississippi. The yard has experienced design and production delays due to personnel shortages and technical difficulties. This is naturally a matter of concern to the Navy.

The LHA program is definitely running behind schedule and, as you know, schedule slippages usually impact on costs. We cut this program back from nine to five ships, for reasons unrelated to contract performance, and as a result will have to renegotiate the contract this calendar year. At that time we wish to settle the interrelated questions of cancellation charges, delivery schedule, and liquidated damages for late delivery. Our prognosis is that this settlement will exceed currently budgeted funds, but we do not yet know the magnitude.

We have no definite evidence of significant schedule slippage or cost growth (beyond that caused by inflation) in the DD 963 program. Because the DD 963's follow closely on the heels of LHA's, there exists the possibility of a carryover of delay from one program to the other. I am watching this situation very carefully but beieve that at the moment the best approach is for the Government to adhere strictly to the terms of the contract and do everything in its power to ensure that Litton can and will do likewise. We need these ships now to offset the existing capabilities of the Soviet Fleet. Therefore, I ask you, as a matter of urgency, to authorize the funds we have requested in this fiscal year to buy the next seven DD 963 class destroyers.

CVN 70.—We are requesting 299 million dollars for advance procurement long lead time nuclear and propulsion components for CVN 70. With the remainder of the ship funding provided in fiscal year 1974, we estimate a target end cost of 951 million dollars, based on fiscal year 1972 budget factors for escalation. Construction of this carrier will provide us the flexibility of maintaining a modern 12 CV force and up to three older carriers well into the 80's.

CVN 70 is the third carrier of the *Nimitz* class originally approved by DOD in fiscal year 1967 which provided for the construction of a nuclear powered carrier in fiscal year 1967, fiscal year 1969, and fiscal year 1971. The CVN 70 has been deferred by previous Congressional and DoD actions resulting in the earliest delivery now possible in late 1980. Unanticipated inflation of material costs and labor rates, and interrupted sequence of construction in conjunction with *Nimitz* and *Eisenhower* have all contributed to the increases in costs.

Admiral Zumwalt will describe in detail the need for CVN 70. I will only add that I support his views on the need for this carrier. The fact is that in the past 25 years we have relied repeatedly on our carriers to provide the means for executing our national policy. The growing capability of the Soviet Fleet is rapidly threatening our continued supremacy at sea. The U.S. carrier-based air power is the margin of difference between the two navies. At the same time, continued reduction in the number of our overseas bases indicates that the carrier's role in providing overseas tactical air power will be substantially increased.

F–14.—The F–14 program continues to be a subject of much controversy. The recent announcement by Grumman Aerospace Corporation that it couldn't accept future orders for F–14's at present ceiling prices will naturally have an impact on our planning for fiscal year 1973. Our present budget requests $570.1 million for procurement of 48 F–14A aircraft in fiscal year 1973. We are continuing to validate Grumman's claimed loss estimates.

Clouded by the shadow of increasing costs and often overlooked is the headway made in the development program. F–14A performance to date has been most gratifying with the aircraft meeting and often exceeding specifications. The first Navy Preliminary Evaluation (NPE) was completed in December 1971 and the initial reports indicate the F–14 is an excellent fighter. Nine aircraft are now in a flying status and full radar weapons system tests are scheduled during the next few months.

In summary, the Navy F–14A program is achieving the performance goals that were set forth four years ago. An advanced Soviet fighter, bomber, and missile threat was clearly emerging at that time. There is no other U.S. fighter aircraft in inventory or under development that can meet Navy's multi-mission requirements for sea control and force projection.

S–3A.—This important anti-submarine aircraft program has successfully passed several milestones. On January 18, 1972, the integration of the S–3A electronics packages was demonstrated in the laboratory and on January 21, 1972, the aircraft completed its first flight.

While increasing costs require much scrutiny, I have every expectation that the S–3A will provide the best available carrier-borne ASW weapon system to counter the Soviet nuclear submarine threat.

Improved CH–53 Helicopter.—The Improved CH–53 program is intended to provide the Navy and Marine Corps with a helicopter increasing lift capability from 8 to 16 tons. It will incorporate improved features of maintainability and reliability. Initial design and feasibility studies are complete and the propulsion system test bed is in full operation. The $10.0 million requested for fiscal year 1973 provides for continued development leading to future production of two prototype vehicles.

SSN–688.—Construction of the SSN–688 class submarine continues to be another of our highest priority procurement programs. The Navy has contracted for 12 of these modern, highly sophisticated submarines and has asked that six additional ships be approved as part of the 1973 budget at a cost of $1,050 million.

Patrol Frigate (PF).—We are asking $191.5M to build the lead ship of this new class of escorts, which will protect our vital wartime shipping and support forces, as well as conduct offensive ASW operations.

The PF will be almost unique among our shipping and support escorts in having the ability to shoot down, with a reduced form of our very successful Standard missile system, anti-ship missiles launched from Soviet submarines, aircraft, and surface ships. With a modern sonar and a facility for a helicopter, it will also have a good capability against the still numerous Soviet Torpedo-firing submarines. Wrapped up in a tight package, with gas turbine propulsion, this makes a lot of capability for about $50–55 million per follow ship.

We believe that we will need to build at least 50 similar ships over a period of years to meet our minimum escort needs. As a result of our experiences in building other series-produced ships we are making a number of innovations. The $191.5M for the lead ship will include virtually all of the one-time costs necessary to prepare for series production. Present plans call for the follow ships to be built in three shipyards, in blocks of manageable size, to preserve the economics of series production while giving us greater program flexibility, speedier delivery, and the advantages of competition. The present intention is not to request the follow ships until fiscal year 1975 so that the lead ship construction will be well along and follow ship risks will be minimized.

Undersea Long-Range Missile System (ULMS).—The Navy is requesting a total of $945.2 million in various accounts, to speed work towards this new strategic deterrent system. We had been holding back on ULMS development in hope that progress toward strategic arms limitation would allow us to defer construction to the time when our Polaris and Poseidon submarines come due for replacement. It appears, after a great deal of thought and study, that ULMS is the best way to maintain the sea-based portion of our nuclear deterrent forces. The system will consist of a new long-range, subsurface-launched ballistic missile and a new submarine to carry it. The long range of the missile will allow the submarines to operate close to our coasts and in regions where Soviet anti-submarine forces, even if vastly enlarged and improved, would have virtually no chance of finding and countering them. Ultimately, the new missile will have various features designed to make it very difficult for ABMs to shoot it down. And the new submarine will embody all the improvements in submarine technology we have made since the last missile submarines were authorized nine years ago.

Status of Shipbuilding Cost Growth.—$155.7 million of the funds requested last year for shipbuilding cost growth and for completion of prior year shipbuilding programs were deleted because they would not be obligated during fiscal year 1972. In addition, we were directed to review unexpended balances in hopes of reducing the fiscal year 1973 request for cost growth. We have made such a review and are requesting $7.3 million less in fiscal year 1973 than was deleted in fiscal year 1972. The request of $148.4 million provides $110.9 million for cost growth and $37.5 million for completion of prior year programs.

Although no funds are being requested this year for new cost growth, there have been additional shipbuilder claims submitted in the past year. $55.4 million has been programed for these claims thus far in fiscal year 1972 and additional funds may be required. Since several of the claims are still under review, an estimate of additional funds may not be available for as much as a year or more.

In summary, the Department of the Navy fiscal year 1973 budget is the largest we have requested although its real buying power is considerably less than that of the budgets of the Vietnam era in the late 1960's. There are several reasons for the increases in the fiscal year 1973 budget.

First, personnel costs are up. This is the result of the recent pay increases which are necessary in connection with our continued emphasis on recruitment and retention of highly qualified military personnel. Secretary Laird has recently stated that since 1964 military average basic pay rates have more than doubled (125 percent growth) and average civilian salaries have increased by 70 percent. This is reflected in an increase from 51 to 61 percent in the amount of the DOD budget allotted to military and civilian manpower. The percentage of the Navy Department budget alloted to manpower remains considerably beneath the DOD figures, having risen only 2 percent (42 to 44 percent) during the same period. Of additional interest, in terms of constant fiscal year 1973 dollars, the total Navy Department Budget has risen $3B while there has been no increase in the amount allotted personnel. Clearly recognizing the greatly increased cost of manpower, we will continue to exercise all possible measures to minimize the percentage of our budget allotted for this purpose.

Second, our procurement budget continues at a high level, reflecting the urgent need to modernize our ships, aircraft, and weapons. It represents our response to the need for increased capability in the light of reduced force levels and the continuing improvements in Soviet naval power and influence.

Finally, our emphasis on R.D.T. & E. continues high, which relates to the pressing requirement for technological growth if we are to have reduced force levels. Our R&D effort is one of our most important investments at a time when U.S. forces are declining while Soviet capabilities are on the ascent. Only through an aggressive R&D effort will we be able to develop weapon systems which are more effective, yet require less people for operation and maintenance.

V. CONCLUSION

As you can see, we have made progress toward our major objectives. Even so, the growing capability and increasing worldwide activity of Soviet seapower tend to reduce our position relative to the Soviet Navy. The modern and expanding Soviet Navy is clearly exhibiting political clout and making an impact. Its need to protect Soviet sea lines of communication is not a matter of vital national interest to the extent it is for the U.S. and allied navies to protect their sea lines of communication. The U.S.S.R. has the advantage of designing its forces principally for the neutralization of U.S. Navy forces, whereas our Navy's primary objective is to assure the reinforcement and resupply of our forces abroad. We believe the U.S.S.R. by building up its naval and maritime strength seemingly beyond its needs, is making an obvious move in an effort to project its political power and to be predominant on the world's oceans.

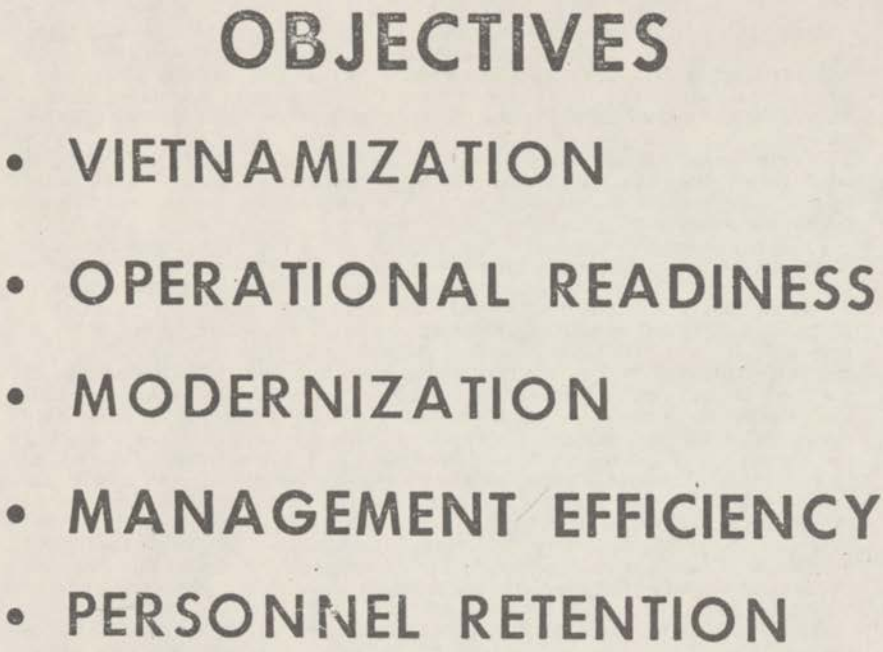
The outward surge of the Soviet Navy is coinciding with pressures for a general worldwide pullback by the U.S. To allow this pullback from bases abroad to affect the maritime power equation on the seas would be a matter of grave consequences to us. Together with the navies of our allies, the U.S. Navy must be capable of maintaining the vital interests of the Free World. To do so, we must maintain a margin of supremacy at sea.

We thank you for your support in the past and ask for it again for our fiscal year 1973 programs which will be justified in much greater detail by the Navy and Marine Corps witnesses who follow me.

REPORT ON OBJECTIVES

Secretary CHAFEE. These are the objectives that we had when I first came here to this job some 3 years ago.

I want to give you a brief report on each of these objectives. We have made a lot of progress toward these goals, but we have not solved all the problems.



SLIDE 1

FIRST, ON VIETNAMIZATION

Secretary CHAFEE. When I came here, we had 84,000 marines in Vietnam and now we are down to less than 500. Of the marines left in Vietnam, none of them are in combat. The great majority are involved in legation support for the Embassy, and some few who are advisers to the Vietnamese Marine Corps.

There were 36,000 Navy men actually in Vietnam. Now, that is down to about 7,000 and will be cut in half, down to about 3,000 by May 1.

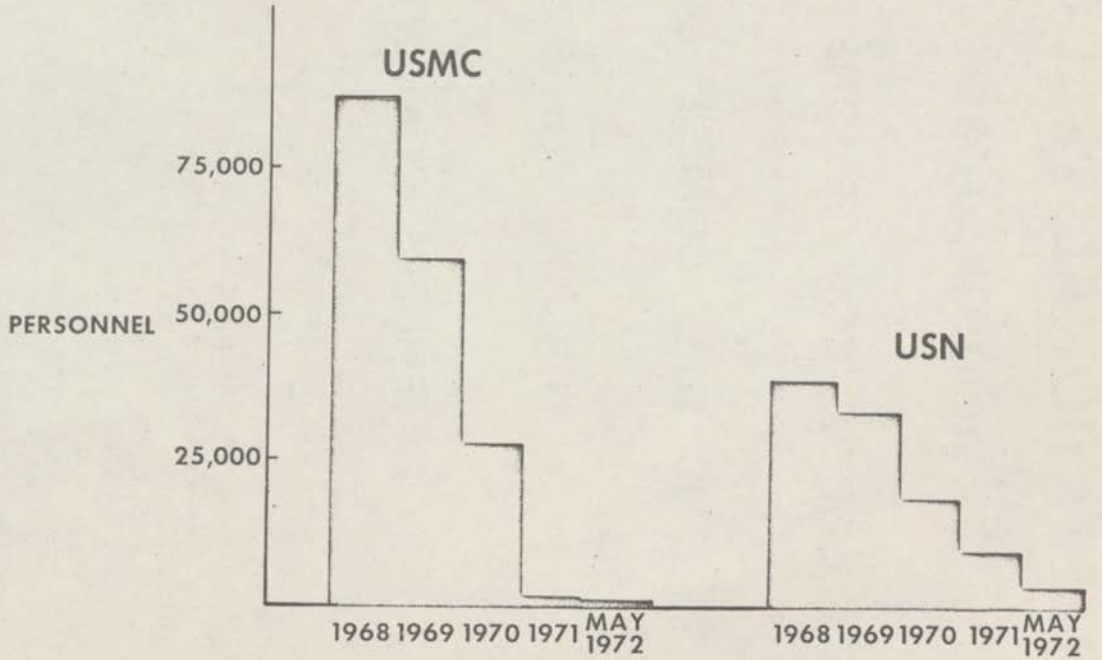
So, for all practical purposes, the Navy and Marine Corps are out of South Vietnam.

READINESS

Secretary CHAFEE. The next challenge we had was readiness. We have made considerable strides in readiness over the past year.

VIETNAMIZATION

SOUTHEAST ASIA WITHDRAWAL



SLIDE 2

OPERATIONAL READINESS

STRATEGIC FORCES

- POSEIDON CONVERSIONS

10 SUBS COMPLETED

9 SUBS IN CONVERSION

2 TENDERS COMPLETED

SLIDE 3

SIXTH FLEET

Secretary CHAFEE. I particularly single out the 6th Fleet because the 7th Fleet was ready in top-notch readiness.

The 6th Fleet, our other major deployed fleet, has improved in readiness as a result of the attention we have been able to give to it. We have added to the 6th Fleet an amphibious assault ship with Marine helicopters aboard, a capability which was not there a year ago.

Of course, antisubmarine warfare is a constant problem. We have added three destroyer escorts equipped with towed underwater surveillance systems [deleted].

We have improved 6th Fleet logistics support, increased the number of our attack submarines in the Mediterranean, and improved the electronic warfare capability of the carrier-based aircraft.

Senator YOUNG. Do you have two carriers there now?

Secretary CHAFEE. Yes, sir. We have had two carriers there for the past 20 years. It is a tough requirement for us and, frankly, if we had it to do all over again I wish we had adopted more flexible carrier commitment there. Now, if we reduce to one carrier our friends over there become alarmed. Even discussions of the Senate sent shock waves all through that area; Greece, Turkey, Italy, Spain. The same way if we increase a carrier; it makes people think we are escalating things. So, we just keep two carriers in there. Before one comes out, the relief carrier goes through Gibraltar.

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MODERNIZATION

SHIPS

NEW IN THE INVENTORY, FY 70-72

- 33 DE
- 18 SSN
- 10 PG
- 33 AMPHIBIOUS SHIPS
- 14 AUXILIARY/UNDERWAY REPLENISHMENT SHIPS

UNDER CONSTRUCTION OR ON ORDER

- 2 CVAN
- 37 FRIGATES/DESTROYERS
- 23 SSN
- 11 AMPHIBIOUS SHIPS
- 7 AUXILIARY/UNDERWAY REPLENISHMENT SHIPS

MODERNIZATION

Secretary CHAFEE. How about the modernization? These are new ships that joined the fleet during the past 3 years. Some of these 33 destroyer escorts were built down in Avondale. We have had 18 nuclear attack submarines report during this period. Also, 10 small patrol vessels, quite a few amphibious ships, principally LST's, and a few underway replenishment ships joined the active fleets.

AMPHIBIOUS SHIPS

We are in good shape in amphibious ships. This slide also shows the ships on order. Leading the list are the nuclear power aircraft carriers, *Nimitz* and *Eisenhower*, which are under construction at Newport News. Thirty-seven frigates and destroyers are under construction. Most of them are the balance of our DE–1052 class destroyer escorts, of which we have received the last.

LOGISTICS

Chairman ELLENDER. Those ships have been funded?

Secretary CHAFEE. Yes. These are under construction or on order. Included in that would be, for instance, the 963 class destroyers being built in Pascagoula. They are a long way from joining the fleet. This looks a little optimistic. There is a lot of difference between being on order and having it in hand.

NUCLEAR-POWERED SUBMARINES

Also under construction or on order are 23 nuclear-powered submarines, 11 amphibious ships, and seven auxiliary or underway replenishment ships.

ASSIGNMENTS TO 6TH FLEET

Chairman ELLENDER. How many have you in the 6th Fleet?

Secretary CHAFEE. We vary. We are trying to get up to [deleted]. We have some diesel submarines there.

MODERN ATTACK SUBMARINES

Chairman ELLENDER. How many of the modern attack submarines do you have?

Secretary CHAFEE. [Deleted] right now.

Chairman ELLENDER. The rest are——

Secretary CHAFEE. The rest are scattered. A lot of them are [deleted]. Of course, we only have 52 SSN's all told. Some are out with the 7th Fleet. Some are on various patrols. We are trying to get up to [deleted].

NUCLEAR-POWERED SUBMARINES

One of our problems with the nuclear submarines is that we want to use them to train our forces. We just don't have enough.

Chairman ELLENDER. Do you find it necessary to send more than you now have there?

Secretary CHAFEE. We would like to get up to [deleted] in the Mediterranean.

Chairman ELLENDER. What is the reason?
Secretary CHAFEE. Primarily to [deleted].

ALLY FLEET ASSISTANCE

Chairman ELLENDER. I understand the Italians have improved their Navy considerably. Do you get any assistance from them?
Secretary CHAFEE. Yes; we do. We get assistance from not only the Italians, we get it from the Greeks, we get it from the Turks, and we also get it from the French. So, I think there is probably no place where there is greater cooperation than in the Mediterranean with those Navies. Now, they are nowhere near the size we are nor the capability. For instance, they don't have any nuclear submarines.
Admiral ZUMWALT. [Deleted.]
Secretary CHAFEE. [Deleted.]

ITALIAN-RUSSIAN FLEET COMPARABILITY

Chairman ELLENDER. When I was in Italy the year before last, I was informed by someone there that the ships that were provided by the Italians almost equalled the force that was used by Russia in the Mediterranean.
Secretary CHAFEE. I think maybe if you took the total number of ships that the Italian Navy has——
Chairman ELLENDER. In the Mediterranean.
Secretary CHAFEE. It would be equal to the total number of ships that the Soviet have in the Mediterranean.
Chairman ELLENDER. That is what I was told.
Secretary CHAFEE. But it would not equal it in capability.

SUGGESTED GREATER ALLY ASSISTANCE

Chairman ELLENDER. I have long held the belief that our allies, particularly the Italians and the French, should have provided more assistance in maintaining peace in the area. I say this on the assumption that a show of force, including the fleet, is necessary to maintain stability in the Mediterranean. I believe that is the theory under which you proceed; is it not?
Secretary CHAFEE. We certainly have found and I have found in my talks with the people there, in Italy and in Greece—I haven't been to Turkey—and in Spain, that what they look to is the size of the 6th Fleet and the readiness of the 6th Fleet.
Chairman ELLENDER. They depend on us to furnish this force.
Secretary CHAFEE. They do.
Senator PASTORE. What is more, when I was there I talked to Admiral Rivero. He confirmed the fact that they keep their ships in port to conserve their oil. We are constantly on maneuvers. I think, myself, we should make a determined effort to secure better participation from them. I realize that one can't gage this situation solely by the numbers of ships. We must include in our thinking the modernization and the quality of the ships, as well.
I think that their Navy is inferior to ours and, of course, it is greatly inferior to the Russian Navy, because the Russian Navy is completely modernized today. That is the one fault with our Navy; we have not progressed rapidly enough in modernization of our own Navy.

I repeat that there ought to be more effort directed to convincing these nations that they have as much at stake as we have in that part of the world, and that the entire responsibility is not ours.

ALLY DESIRABILITY FOR MODERNIZED NAVIES: PENDING U.S. SHIP LOAN LEGISLATION

Admiral ZUMWALT. I have met with all the Chiefs of the Navy, Turkey, Greece, Spain, sometimes twice, sometimes once, since I have taken this job. They agree. They are actively pursuing bilateral and NATO exercises with us. The numbers have increased in the past year or two. They are also very anxious to modernize their navies.

We at the present time have a ship loan bill which has passed the House and is before the Senate. It provided for loans in the case of the Italians of two more submarines; in the case of the Greeks two more destroyers; and in the case of the Turks, one destroyer and two submarines.

So, these nations are very anxious to make a greater contribution, both from the standpoint of increased participation in integrated exercises and improved force levels [deleted].

ALLY PARTICIPATION IN MANEUVERS AND CONSERVATION OF OIL

Senator PASTORE. That is true, but they participate only when we have maneuvers. Our own Navy is always in movement, as is the Russian Navy in the Mediterranean.

All I am saying is that many of the Italian ships are in port because they want to conserve their oil. That is the information I got. I would like to have somebody deny that or affirm that. I realize they talk about cooperation. But, after all, the test of the pudding is in the eating. Are they doing it?

We have been hearing for 10 years that our allies are going to do more, they are going to do more, they are going to do more. This was true before Secretary Laird took office, even before Secretary McNamara was there. They talk that way, very optimistically. The question is: Do they do it?

Chairman ELLENDER. I can answer that question. On my last trip there, the only information I was able to secure was that the Italians were in the process of constructing some naval vessels. The remainder of their fleet is aging. As Senator Pastore has indicated, the Italian Fleet participates in maneuvers, but the U.S. Navy is in the Mediterranean at all times.

Admiral ZUMWALT. We are also limited by oil and we have to come into port because of limitations on our funds, too. We don't have quite as much of a limitation as some of the other navies but we have our limitation.

(The following information was subsequently provided).

Our allies in the Mediterranean operate their navies at rates consistent with the age of many of their ships and the funds allocated to their navies by their governments. Budgetary restraints are especially pressing to the Greek and Turkish navies. We are actively encouraging that a larger share of the defense budgets of Greece and Turkey be devoted to their naval forces. We are benefiting from increased participation from our allies in NATO and other multi-national exercises and operations in the Mediterranean. The French, Greek and Italian

navies made valuable contributions to our [deleted] early this year. Italy, Greece, and Turkey, along with the United Kingdom and the United States, routinely provide ships to NATO's Naval On-Call Force Mediterranean.

BERTHING OF U.S. SHIPS IN MEDITERRANEAN AREA

Chairman ELLENDER. There is another problem that is very vexing to me. Last December I was in Athens. I heard that there was a little conflict over berthing our ships, except in Greece and Turkey. Yugoslavia limits our visits to three or four a year. As far as North Africa is concerned, we are out. There is no place in the Mediterranean where we can actually berth without any difficulty except Greece.

Secretary CHAFEE. We are in Italy.

Chairman ELLLENDER. The Navy is in Naples, where we have been for 24 years. You have a few ships there. But if you were to ask the Italian Government to berth a number of American naval vessels in various ports, you would get a negative reply.

Admiral ZUMWALT. Mr. Chairman, I do not believe the situation is as bad as you state. However, I would like to check it out and provide a statement for the record.

(The information follows:)

AVAILABILITY OF BERTHING SPACE FOR U.S. SHIPS

Consistent with our operational requirements, and scheduling constraints, our 6th Fleet ships enjoy regular access to the ports of all our NATO Southern Flank allies: in the recent past, visits have been made to Turkish Black Sea and Mediterranean Sea ports, and to Greek and Italian ports as well. Additionally, recent port visits to other friendly Mediterranean states, e.g., Spain and Morocco, have been made by 6th Fleet combatant ships. Also, within the last year we have added three Destroyer Escorts, two Patrol Gunboats, and a destroyer tender to the ships homeported in Italy. The Italians have been most cooperative in these endeavors, as they have been in supporting our—and British—maritime patrol aircraft operations set out of Sigonella, in Sicily.

Senator PASTORE. The only country there, with the exception of Turkey, that gets military assistance is Greece. Naturally, there is an accommodation on your port facilities. We don't have the same arrangement with other countries. We have to enter into bilateral agreements. Greece is one of the few countries in Europe that receives military assistance.

Chairman ELLENDER. If we have to buy our way there to help our allies, I am going to draw the line.

Secretary CHAFEE. Mr. Chairman, let me say something, if I might, about homeporting the ships.

In Italy, we have homeported seven ships. This includes the three destroyer escorts that I mentioned earlier, which have gone over since I have been in this office, I think they went over about 2 years ago.

Chairman ELLENDER. Do you have to pay a fee for that?

Secretary CHAFEE. No. We don't pay them any fees. We have homeported the PGs that I mentioned, the escort vessels. We have homeported there the *Springfield* which is the flagship of the fleet in Gaeta. We have homeported a destroyer tender in Naples.

So that, true, we have to go and ask them. We can't just walk in and park a ship and 400 people. But, the Italians have been very forthcoming with us. You have been to the airfield in Sigonella which we operate out of in Sicily. Without the NATO airfield, we and other Allied Forces would be in a difficult spot.

You have seen the facility we have in Naples there. We have a hospital. There is one thing to remember—I know we have been through this every year—but it is to our self-interest to keep peace in that area. We are not just there for altruistic reasons.

Changed Circumstances and Insistence Upon Greater Ally Participation

Senator Pastore. That is true, but the fact remains that it is to their self-interest, too. We have taken the lion's share of the burden. I keep saying things have changed a little bit. We don't seem to have the money that we used to have. The American dollar does not seem to have the same integrity abroad that it used to have. A lot of things have changed. Much of this is to the good.

These people have lifted themselves up, with our help, by their own boot straps. The fact remains that they are better off than previously. We are committed in the same way we were originally committed, and they are committed in the same way as they were originally committed. We are on dead center.

The worst thing that this country could do is to withdraw the 6th Fleet from the Mediterranean. I think it would become a possession and prerogative of the Russian Navy. There is no question about it. We cannot afford to do that.

We are not trying to withdraw our Navy. All we are saying is that we ought to insist on better participation by our allies. But we have been saying this for 20 years, and we don't get any results.

NATO 5-Year $1 Billion Infrastructure Program

Admiral Zumwalt. I think, Senator Pastore the Secretary of Defense posture statement will be presenting the fact that NATO has agreed to increase by $1 billion its investments this forthcoming cycle.

Chairman Ellender. That is for construction over a period of 5 years on the soil of those contributing.

Admiral Zumwalt. And forces, sir.

Senator Pastore. I want to be here the day you say they spent the billion dollars.

Continual and Unsuccessful Promises To Try To Obtain Greater Assistance

Secretary Chafee. I wish we could get them to do more.

Chairman Ellender. Why can't you? From Mr. Johnson on down to Mr. Laird the first question I posed to each Secretary of Defense was "When will you get our allies to provide their just share?"

They would reply, "Oh, yes; we are doing all we can. We will try." But they have never succeeded.

Secretary Chafee. Maybe it is more difficult to do.

Senator Pastore. This is not your fault or Admiral Zumwalt's fault. This is a political question. This has to be settled on the highest level of Government. There is no question about it. You people have nothing to do with negotiating these treaties.

Chairman Ellender. Who was higher than Secretary Laird who came before us?

Senator Pastore. The President of the United States, Mr. Chair-

man. He is the highest officer, through the Secretary of State and the Secretary of Defense.

ALLIED CONTRIBUTION TO NATO

Chairman ELLENDER. I have been pleading with our Defense Department ever since I have been on this committee to get our allies to provide more money to help us, but to no avail.

Secretary CHAFEE. Mr. Chairman, let me say this: True, it has not been what we wanted to the fullest extent, but the NATO alliance is certainly the finest alliance that this world has seen, certainly in the history of our country. The NATO nations contribute substantial amounts. They are not doing what we want but they are doing a lot more than anybody would have expected 30 years ago.

Chairman ELLENDER. I would venture they don't put up a dime more than they would have done if there were no alliance, because we are carrying the whole load.

Secretary CHAFEE. I don't think that is fair, Mr. Chairman. I can't agree that we are carrying the whole load.

Chairman ELLENDER. I am saying we are.

Secretary CHAFEE. I don't understand how you arrive at that conclusion.

Chairman ELLENDER. I shall restate it, if you wish. It is my sincere belief that none of our NATO allies are providing any more for their national defense than they would have done had there been no NATO. In 1960, when I visited Western Europe, I found that although the Defense Department had indicated there were seven active German divisions, there was actually only one, the rest being paper divisions. I believe that this was true of our other allies. Year before last, when I again visited Western Europe, I found little progress in that respect, except in Germany, which did provide a number of divisions, although they were not nearly as well equipped as our own. I personally feel that these nations have been only too willing to let the United States carry the burden.

Senator PASTORE. Of course, Mr. Chairman, the corollary is present, too. We are doing as much as we would have done if we had no NATO alliance. After all, the Mediterranean is an important body of water for American security. We can't give it up to the Russians. The Russians are there in big style.

I agree with the Secretary. I don't think we can criticize NATO. But I think specifically our allies ought to be made to come up with a great deal more. That is all I am saying.

Chairman ELLENDER. I am saying that we have been in the Mediterranean, Senator Pastore, for 22 or 23 years.

Senator PASTORE. We have had peace during this time.

Chairman ELLENDER. Our presence there is probably one reason the Russians came in.

BRITISH AND FRENCH SUBMARINES

Senator YOUNG. Are the French and British building nuclear submarines?

Secretary CHAFEE. Yes. The British have nuclear submarines. They have nuclear Polaris-type submarines and nuclear attack submarines.

The French, also. They have the Polaris submarine but they do not have a nuclear attack submarine.

Chairman ELLENDER. When was that constructed?

Admiral ZUMWALT. They are building Polaris-type submarines.

Chairman ELLENDER. But they don't have them yet.

Admiral ZUMWALT. I don't think they are at sea.

(The following information was subsequently provided:)

The French have their first nuclear powered ballistic missile submarine, *Le Redoubtable*, at sea now. Three more ships of the class are scheduled to enter service during the next 4 years.

Secretary CHAFEE. But the British have them. The British have deployed four.

UNITED STATES BURDENSOME ROLE IN NATO

Chairman ELLENDER. I do not want to keep on arguing, Mr. Secretary, but in Western Europe for a long time we had more active troops than all of our allies put together. If Russia had struck in June or July of 1960, the only divisions ready to fight were our five divisions and a brigade from Canada. That is all. The forces of our other allies were composed, for the most part, of paper divisions and reservists. How in the world we could permit that to continue, as I pointed out in 1960 when I came back from Western Europe, is something I could not understand.

As a matter of fact, I really believe that, in some respects, things are worse now in Western Europe than they were in 1960, because France is not so willing to cooperate as she was in the past. Nevertheless, we are still in the Mediterranean in full force, at our own expense.

Since that time, we have made heavy expenditures in Spain. Nobody has helped us there. We have to rent the Azores bases. No one helped us there either.

We still spend in total in that area in the neighborhood of $14 billion a year.

Secretary CHAFEE. Mr. Chairman, I am just here to present the Navy budget.

Chairman ELLENDER. I just wanted to show you how I reached the conclusion that we are carrying most of the burden.

Secretary CHAFEE. Let me just conclude——

Senator PASTORE. Privately, Mr. Secretary, your people will admit that but there is nothing we can do about it. We are carrying the lion's share.

I find our officials a little apologetic for what they are not doing. I hope some time we can get them to come before the committee and say, "Mr. Chairman, I agree; we have to get these nations to do more, and we are pushing them."

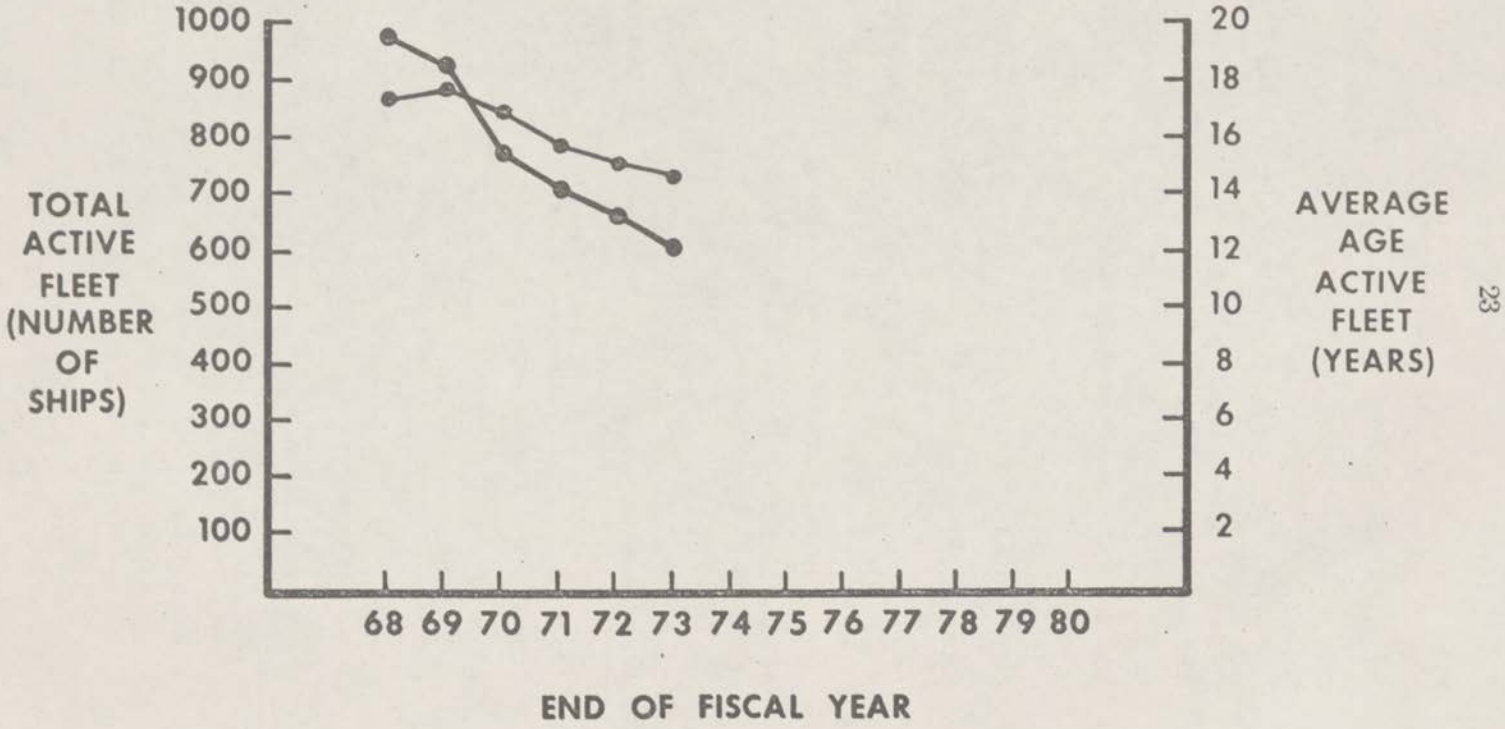
Our officials explain that we understand other nations' problems, but they don't seem to understand ours.

The American dollar is in a little bit of trouble. We are not as flush as we used to be. Now our allies are more prosperous, a little more flush, than they used to be. We should importune them to "come up with a little bit of the flush."

Secretary CHAFEE. [Deleted.]

Chairman ELLENDER. And Germany. All of them are doing very well.

SIZE AND AGE - ACTIVE FLEET



3-YEAR SHIP REDUCTION

Secretary CHAFEE. Now, Mr. Chairman, this is a graph that shows how we have come down in the number of ships over the past 3 years.

When I first came to this job, we had 934 ships. At the end of fiscal year 1973, we will be down to 594 ships.

So, the Navy will have come down in numbers of ships by more than one-third, which is a huge drop.

Chairman ELLENDER. Is that in 1973?

Secretary CHAFEE. This is the end of fiscal 1973, we will be down to 594 ships.

Chairman ELLENDER. How many have you now?

Secretary CHAFEE. We have 655 now.

RUSSIAN SHIPS

Chairman ELLENDER. How many have the Russians altogether? Do you know?

Secretary CHAFEE. I don't know the exact numbers.

Chairman ELLENDER. I will tell you that from information given to this committee that the Russians had in 1962 [deleted] altogether and in 1972 they had [deleted].

UNITED STATES AND RUSSIAN COMBATANT VESSELS

Admiral ZUMWALT. I think, Mr. Chairman, a more relevant figure is the number of combatants.

Admiral Moorer will be presenting this committee with the fact that the Russians have increased to [deleted] where we are dropping to 188 in the major combatant vessels.

Your figures include only the major surface combatants and submarines. They exclude all the auxiliaries, the minesweepers, the service ships. If you look at the fighting ships, the Soviets have more than we will have by the end of next year.

(The information follows:)

The Soviets actually have in 1972, [deleted] major surface combatants and [deleted] submarines, for a total of [deleted] ships of the categories to which you were referring. In addition, they have [deleted] mine warfare ships, [deleted] amphibious ships and [deleted] auxiliaries for an overall total of [deleted] ships. This does not include the hundreds of minor combatants and amphibious and service craft which are not considered a part of their "blue water" navy.

Chairman ELLENDER. At the present the Russians have increased their ships by about 7 percent in 10 years.

Secretary CHAFEE. And we have come down, Mr. Chairman. We now have fewer ships in the U.S. Navy than we have had in the past 20 years. We have fewer men in the U.S Navy than we have had in the past 20 years.

AVERAGE AGE OF U.S. SHIPS

Senator PASTORE. That would not be bad if we had modern ships.

Secretary CHAFEE. This line on the slide shows what happened to the age of our fleet.

The average age of our ships is shown in years. When I came here, we were averaging 18 years per ship. We will be down to 14.5 years by end fiscal year 1973. That is due to our phasing out the older ships. However, it also reflects the new ones which have come in. So, our

fleet will be much smaller in size but it will be younger in age. It will hardly be a youthful fleet with an average age of 14.5 years.

Now I will talk a little bit about aircraft.

NUCLEAR POWERED FRIGATES

Senator PASTORE. Before you get to aircraft, we have one nuclear aircraft carrier. We have how many frigates, nuclear powered?

Secretary CHAFEE. *Long Beach*, *Bainbridge*, and *Truxton*.

Senator PASTORE. How many frigates do we have under construction?

Secretary CHAFEE. The *California* has been launched, but is not completed yet.

The *South Carolina* is being built.

We have just let a contract for three more. I am talking about nuclear powered frigates. That will make five. But it is not accurate to say that the last three are under construction even though the contracts have been let.

Senator PASTORE. Then, we have three frigates in operation.

Secretary CHAFEE. We have three nuclear powered escorts, one of which is the cruiser *Long Beach*.

CONVENTIONAL FRIGATES

Chairman ELLENDER. How many conventional frigates do you have?

Secretary CHAFEE. We have 28. Two of these are undergoing "modernization" and are not in commission as of this date.

NUCLEAR AIRCRAFT CARRIER EFFICIENCY

Senator PASTORE. If you don't mind, Mr. Secretary, I will ask you and I will ask Admiral Zumwalt, too, can you give us the percentage of efficiency of a nuclear aircraft carrier which is escorted by conventionally fueled escorts?

Admiral ZUMWALT. I would like to provide the numbers for the record, but it is considerably less efficient.

The requirement to have one conventional escort with the carrier reduces by a significant fraction the number of days that the task force can operate and the addition of a second conventional escort instead of a nuclear escort roughly doubles the rate of expenditure.

(The information follows:)

The capabilities of a carrier task force are much improved each time a nuclear warship is substituted for a conventional warship. When a nuclear carrier is substituted for a conventional carrier the range of the task force with conventionally powered escorts is about doubled. When half of the warships accompanying the nuclear carrier are changed to nuclear propulsion the range of the task force is doubled again. When all of the ships in the task force are nuclear powered the range of the task force is essentially unlimited even at high speed. Thus the greatest benefits of nuclear propulsion are achieved when all the frigates in a task force with a nuclear aircraft carrier are nuclear powered.

Senator PASTORE. We have the *Enterprise*. We are going to have the *Nimitz* and *Eisenhower*; is that right?

Admiral ZUMWALT. That is right.

Senator PASTORE. We have three frigates now operational.

Secretary CHAFEE. Three nuclear-powered escorts, that is correct.

Senator PASTORE. You are talking about two under construction

and three are going under contract. What will that mean to our three aircraft carriers? You are asking for another aircraft carrier. You say that is a must. You are giving it the highest priority. That will bring us to four aircraft carriers.

Nuclear-Powered Frigates Necessary for Escort of Nuclear-Powered Aircraft Carriers

In order to nuclearize those aircraft carriers insofar as escorts are concerned, how many frigates do we need?

Admiral Zumwalt. In my judgment, we need 16.

Senator Pastore. How many will we have when construction is completed?

Secretary Chafee. Eight.

Shortage Rationale

Senator Pastore. Now we are eight short. Will you explain to me, Admiral, what is the rationale in telling this committee and telling the Committee on Armed Services that we are not going to have the nuclear-propelled frigates?

Secretary Chafee. You had better not put the Admiral on the spot, because he is for it.

Senator Pastore. I would like to get his opinion on the record. That is why I am asking him, because he is the man who is going to respond to any challenge that is made to the U.S. Navy.

Secretary Chafee. Right. And I am against it. I am against the nuclear escort and he is for them.

Senator Pastore. Why are you against them?

Secretary Chafee. Because they are too expensive. When you look at the requirements that we have, the problems that face this Navy in the future, there are better ways of using the limited funds available for defense.

Senator Pastore. Admiral Zumwalt made a very significant presentation yesterday about our oil running out in 1985 and about our having to protect our channels of delivery. The big question here is: Isn't it better to protect those channels with nuclear-propelled ships?

Admiral Zumwalt. Unquestionably, in my judgment, sir.

Senator Pastore. Here you are, you represent the best minds in the U.S. Navy, and you disagree. One is a civilian and one is a Navy man.

Admiral Zumwalt. And he is boss.

Senator Pastore. That is right. That is why we get befuddled here. The admirals come in, Admiral Moorer comes in, Admiral Zumwalt comes in, and these are the men who must give the commands in time of crisis. Yet, Mr. Packard and Mr. Chafee and Mr. Laird disagree with them.

How do we make the choice? Do we listen to you, Mr. Secretary, or do we listen to the Chief of Naval Operations because he is going to give the battle orders?

Secretary Chafee. I suggest stick with us.

Senator Pastore. You do?

Secretary Chafee. Yes.

Senator PASTORE. I think you are 1,000 percent wrong.

Secretary CHAFEE. Let me give you my reason, Senator. We have only so much money in the Navy to spend on new ships.

Senator PASTORE. If your wife had a serious illness, you would not begin to talk about money, you would get the best doctor.

He has already told us that our efficiency comes down appreciably because you are half nuclear and half conventional. You are half male and half female.

Secretary CHAFEE. No, Senator; I don't agree with that. That is an oversimplification.

Senator PASTORE. It is not an oversimplification, because the one outstanding feature of your nuclear power is the lasting durability of the propulsion that you receive without refueling. Am I right or wrong?

Admiral ZUMWALT. Yes, sir.

Senator PASTORE. I am right.

If you are escorted with conventional ships, and you are in trouble in the Mediterranean, you have to refuel those ships, don't you?

Admiral ZUMWALT. Yes, sir.

Senator PASTORE. Where does that oil come from? You have to carry it on the carrier. Am I right?

Admiral ZUMWALT. Yes, sir.

Senator PASTORE. So you are overburdening the carrier. Am I right?

Admiral ZUMWALT. Or you must get a tanker.

Senator PASTORE. And the tanker cannot go as fast as that nuclear carrier, can it?

Admiral ZUMWALT. No, sir.

Senator PASTORE. I am telling you, you are putting BB's in a bazooka. We had better begin to understand this. We are talking about modernizing the Navy. That is the reason why I don't care how many ships you have, I want them nuclear.

Secretary McNamara said a long time ago that we are going to require a nuclear Navy. Do you know how far we are away from that?

I disagree with the mixed force idea 1,000 percent. If you are going to have a nuclear aircraft carrier, it should be escorted by nuclear ships.

WISER UTILIZATION OF EXTRA-PROVIDED FUNDS FOR AIRCRAFT

Senator YOUNG. Mr. Secretary, you would have no objection to building the ships, if the Congress gave you the money.

Secretary CHAFEE. I would have better ways to spend additional money. Look at the number of aircraft we have been buying. We are buying this year 282 aircraft. Ridiculous. We expect to lose 253 aircraft by attrition alone in fiscal year 1973.

1973 SHIPBUILDING PROGRAM: HIGH COST OF NUCLEAR SHIPS

We are buying this year, in the largest shipbuilding budget this Navy has had in the past 20 years, only 20 new ships. Try to replace a fleet on that.

Senator PASTORE. How many of those ships are nuclear?

Secretary CHAFEE. None of the surface ships are nuclear. Six of the 20 new ships are nuclear powered attack submarines.

Senator PASTORE. There you go. You are fighting this next war with turn of the century ideas. That is what you are doing.

Secretary CHAFEE. We have some nuclear ships now, the *Long Beach*, the *Truxton*, and the *Bainbridge*. They have added capabilities but they are very expensive.

WISER UTILIZATION OF EXTRA-PROVIDED FUNDS

Admiral ZUMWALT. I would like to join Mr. Chafee on the point that, if the Congress added a billion dollars to this budget, I believe that we would want to spend that billion dollars—because we are in such poor shape—for several things before we would buy the additional nuclear frigate.

The aircraft picture is very poor. We need many more escorts of a smaller, cheaper size. So, at the budget levels to which we have been reduced, we just can't afford an all-nuclear Navy. We need more money.

Senator PASTORE. I realize that. The big question here is a matter of priority, of course, but it is a matter of security, too. We are talking about the security of this country. Are we in trouble or aren't we in trouble? Must we be on the alert or mustn't we be on the alert?

If nothing ever happens in the world, we are going to waste all this money. You would not have had to come here this morning. We could take the budget and cut it in half and say, "Look, nothing will ever happen."

But the one way to stop it from happening is to make your adversary realize that you can win any time he starts a conflict. You know that. That is the only defense we have.

You come here and say we want a nuclear aircraft carrier, and I agree with you. You need another aircraft carrier and it needs to be nuclear.

All I am saying is, if you are going to have a nuclear aircraft carrier, it is silly to provide conventional ships as escorts.

Secretary CHAFEE. Let me make one other point on this subject, Senator Pastore. There is a lot involved besides fuel in the aircraft carrier. If that aircraft carrier goes out and drops bombs and shoots rockets and performs in that way, it has to be replenished with ammunition. In other words, it can't operate long periods completely by itself.

Senator PASTORE. That is right. That aircraft carrier, however, does not have the same potency against a nuclear power. I agree with you on that.

The facts remain that if we were going to engage in a conventional war, I don't care whether you have to resupply ammunition, you give me a nuclear carrier, nuclear frigate, and nuclear destroyers, and I am satisfied.

Secretary CHAFEE. Let me say this, Senator: You give us a nuclear carrier and I will be satisfied in this budget.

AIRCRAFT

Chairman ELLENDER. At this point the chart on aircraft modernization will be provided for the record.

(The chart follows:)

AIRCRAFT MODERNIZATION

NEW IN THE INVENTORY, FY 69-72

- ATTACK--A4M, A6E, A7E, AV8A
- PATROL--P3C
- ELECTRONIC WARFARE--EA6B
- OTHER--KA6D, CX, CT39

UNDER DEVELOPMENT

- ASW--S3A (IOC 1974)
- FIGHTER--F14 (IOC 1973)
- EARLY WARNING--E2C (IOC 1973)
- HELO--RH53D (IOC 1973)
- V/STOL--(IOC 1980s)

SLIDE 6

Secretary CHAFEE. Here are the aircraft we procured. These are new aircraft over the past 3 years. The A–4M, which is primarily for the Marines. It is a wonderful aircraft. The A–6E, you are familiar with. These AV–8A's are the Harriers. The P–3C is a Lockheed patrol aircraft. These EA–6B's are Grumman. Finally these listed on the lower half of the slide are the ones we have under development.

F–14 AIRCRAFT: CONTRACTOR PERFORMANCE

Chairman ELLENDER. What is the latest information on the capability of Grumman to supply the F–14 under the original contract?

Secretary CHAFEE. They have written us a letter the first of the year saying they will not be able to perform, in their judgment, under the contract for lot V and subsequent.

Chairman ELLENDER. What are you going to do about it?

Secretary CHAFEE. We are sticking by the contract. We are requesting the sums in the budget which are in conformance with the con-

tract. We are doing everything we can to work with Grumman to cut down their costs. We will see how the situation develops over the summer.

Chairman ELLENDER. This matter of performance on the part of the contract will have to be resolved before funds are provided for the F–14. With the contractor saying he will not produce the aircraft under the terms of the existing contract, and the Navy saying they are going to hold the contractor to the contract, it places the committee in a difficult position. If Grumman says they won't build it under the contract that you have in mind, we may have to look to other sources or increase the ante.

Secretary CHAFEE. It may be, Mr. Chairman, that that will be necessary. What we would like to do is to stick by the contract. That is our position.

Chairman ELLENDER. I think Secretary Laird takes that position, does he not?

Secretary CHAFEE. Yes, sir.

Chairman ELLENDER. I am informed from good sources that Grumman will under no condition build under that contract.

Admiral ZUMWALT. They said the same thing last year, Mr. Chairman, and did go ahead.

Chairman ELLENDER. Did they continue production?

Admiral ZUMWALT. Yes, sir.

Secretary CHAFEE. Yes, sir; they accepted the lot IV.

Chairman ELLENDER. How many were built?

Secretary CHAFEE. Well, they are building 48 F–14A aircraft.

Chairman ELLENDER. How many more are they building under the contract?

Secretary CHAFEE. Forty-eight more to be funded in fiscal year 1973.

Chairman ELLENDER. You need how many altogether?

Secretary CHAFEE. We have said 313.

Chairman ELLENDER. That is to equip——

Secretary CHAFEE. The 14 aircraft carriers that we have plus the training squadron and pipeline.

OTHER AIRCRAFT

Secretary CHAFEE. The lower part of this slide shows the new aircraft we are asking for that are under development. I believe you are familiar with most of them. This is the S–3A antisubmarine warfare aircraft.

This is the Grumman F–14 we have been discussing.

This RH–53D is a new upgraded helicopter.

Chairman ELLENDER. What is that early warning item?

E2–C AIRCRAFT

Secretary CHAFEE. That is the E2–C.

Chairman ELLENDER. That is not new.

Secretary CHAFEE. It has been around. You provided the money for it in past years. We are just receiving the first one now. We are not requesting something new here.

VTOL: Naval and Air Force Versions

Senator Young. What is the VTOL?

Secretary Chafee. The V/STOL, vertical/short, take off and landing aircraft, is a prototype that we are thinking about. As you remember, Mr. Pickard discussed with you last year his prototyping concept. This is one of the weapons systems we have under consideration in the prototype program. We have not done much on it yet except send out requests to the different manufacturers.

Senator Young. Are you working with the Air Force on that? They are asking for a VTOL, too.

Secretary Chafee. Yes.

Frank, do you have anything on that?

Mr. Sanders. Those are both research and development type. We are coordinating with the services and at the OSD level. They are different approaches.

Secretary Chafee. This is quite a ways down the line. We would not get this until the 1980's. This is really looking to the future.

SYSTEMS MANAGEMENT

Now, Mr. Chairman, one of the problems we have had, as you know, is trying to manage our systems more efficiently. These are some of the steps we have taken. The last one which will be of interest to you is the prototyping. I won't say that we have solved all the problems in our procurement to date.

RETENTION

When I first came here, retention of military personnel was the single biggest problem we had. Last year, 1971, our retention was doubled. We went from 10 percent up to 20 percent. These are for our first-term people. This is due to a variety of factors.

We think these have all helped. Of course, the pay increases have helped. The activities Admiral Zumwalt has given such splendid attention to have helped.

We particularly want to thank you for the family housing. You have always supported us in our housing and I hope you will continue to do so.

Chairman Ellender. Housing was my first interest when I came here in 1937.

Secretary Chafee. This shows you how we have done in the different officer categories.

Nuclear Submarine-Trained Officers

We have a retention objective for our nuclear submarine-trained officers of about 62 percent. Here you can see that in 1968 it suddenly took a dive. We weren't getting any 62 percent. We were getting around 35 to 40 percent.

Senator Pastore. Retention?

Secretary Chafee. Retention of officers.

The figure we use is the percentage of officers remaining during the 2 years immediately following their obligatory service. This is considered the prime decision-making time, for if they remain beyond this period, they normally are with us for the balance of their careers.

MANAGEMENT EFFICIENCY

WEAPONS SYSTEMS ACQUISITION

- IMPROVED COST ESTIMATING CAPABILITY
- UPGRADING OF PROGRAM MANAGEMENT FUNCTION AND PERSONNEL
- MORE EFFECTIVE CONTROL OVER CHANGES
- EMPHASIS ON RISK ANALYSIS
- IMPROVED CONTRACT ADMINISTRATION
- INCREASED EMPHASIS ON TEST AND EVALUATION
- PROTOTYPING (FLY BEFORE BUY)

SLIDE 7

PERSONNEL RETENTION

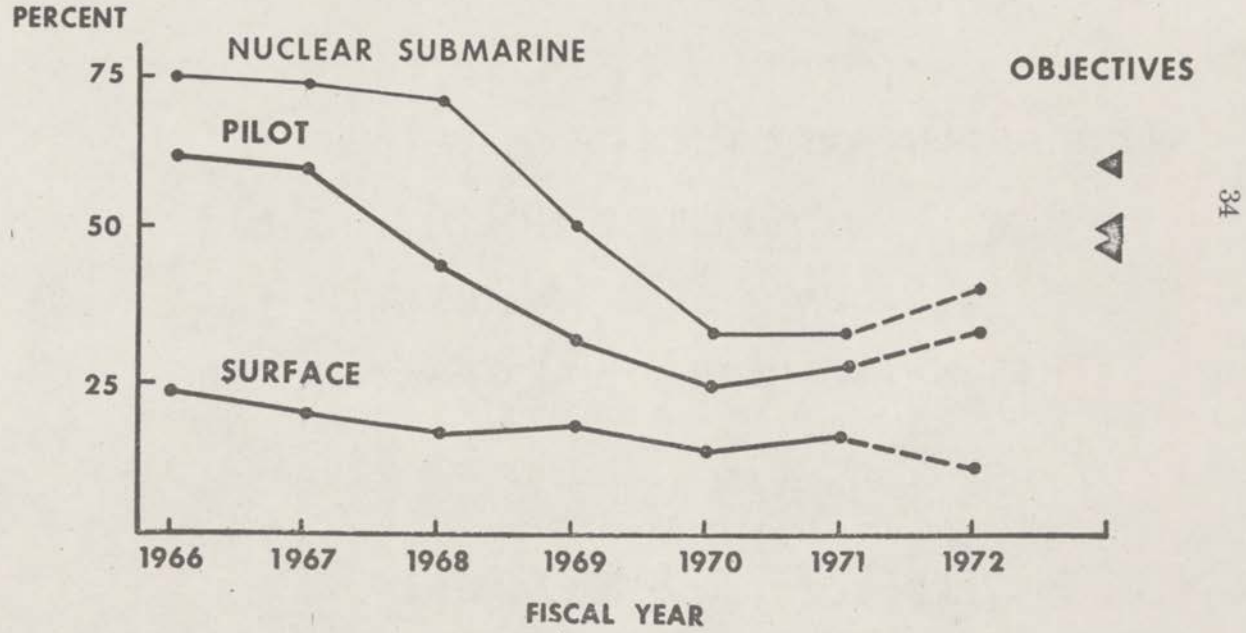
INDUCEMENTS

- INCREASED PAY AND ALLOWANCES
- REDUCED FAMILY SEPARATION
- ELIMINATION OF IRRITANTS
- NEW EMPHASIS ON EQUAL OPPORTUNITIES
- BETTER BACHELOR HOUSING
- MORE FAMILY HOUSING
- MORE EDUCATIONAL OPPORTUNITIES
- BETTER SERVICES FOR DEPENDENTS

SLIDE 8

PERSONNEL RETENTION

NAVY OFFICERS



Slide 9

PROMOTION OF OFFICERS ASSIGNED TO OTHER AGENCIES

Senator PASTORE. I read with amazement about one of the astronauts who quit his post with NASA because he thought that he was eliminating himself from promotion only because he was with NASA.

On this matter of retention, has it been determined that if you train a man for a nuclear submarine, and he stays on that duty, does he forfeit any promotion advantages just because he stays at that post?

Secretary CHAFEE. No.

Senator PASTORE. That has been the trouble in the past, as you well know.

Secretary CHAFEE. I don't believe that this is true in this area. I would say in the area where a man might have lost out in some way is where he stepped out of the Navy and into another field such as when General Cushman went over to CIA. People might say he was out of the Marines. It turned out he did very well.

NASA is an out-of-the-Navy activity. Yet, we have promoted our people with NASA right along with everybody else. As a matter of fact, Captain Shephard became an Admiral.

PROMOTION OF NUCLEAR SUBMARINE TRAINED OFFICERS

Senator PASTORE. Coming back to your nuclear submarine discussion, this is a highly technical environment. You need people not only disposed to that kind of post, but they also have to be of a certain intellectual caliber, because of the intricacies that are involved in nuclear submarine warfare. What is the ordinary tour of duty?

Secretary CHAFEE. The nuclear training is just part of submarine training. They are essentially submariners. Instead of being trained with diesels, they are being trained with nuclear power. Then they will come up through the submarine ranks. As a matter of fact, most of the Admirals that have been selected from the submarine community have been nuclear trained in recent years. There is no hindrance to their going up. It is just that they are submariners as opposed to aviation.

Senator PASTORE. What is the highest rank that a skipper of a nuclear sub might attain?

Secretary CHAFEE. There is no limit. Admiral Wilkinson is an example. He has risen to Vice Admiral.

Senator PASTORE. Does he stay with the nuclear forces?

Secretary CHAFEE. He is now with the nuclear submarine fleet. He is commander of the Submarine Force, U.S. Atlantic Fleet.

Senator PASTORE. How many admirals do you have?

Secretary CHAFEE. When they become admirals, they don't necessarily stay with the nuclear submarines. They branch out into the other fields. The man who is head of all our antisubmarine warfare activity in the Navy is nuclear trained.

Senator PASTORE. Are you saying that no matter how long a man stays with the nuclear submarine fleet the fact remains he does not lose out at all?

Secretary CHAFEE. Not at all.

Senator PASTORE. When it comes to promotion outside that particular fleet?

Secretary CHAFEE. Not at all. It is exactly like being in the aviation unit.

Senator PASTORE. I am happy to have you say that, because it is a highly specialized field. It is not attractive to all people. It is a tedious thing, especially staying under the water for that period of time. It is not as delightful as being on an aircraft carrier, I tell you that, although these are dedicated people who just love to do it and they do it well.

I would hope we treat them as well as, or even maybe a little better than, some of the other services that are performed, because of the character of this kind of assignment.

Secretary CHAFEE. They are such top-notch people that if you look in our selection list for, say, promotion from Commander to Captain, you will find a higher percentage of nuclear trained submarine officers are promoted than in the other fields.

Senator PASTORE. How does that account for the fact that retention dropped down to 35 percent?

Secretary CHAFEE. It dropped down, I am convinced, because we were building nuclear submarines at quite a rapid rate. We weren't able to train enough submarine officers, so that they were spending a lot of time on the boats at sea. They just got sick of it. As you mentioned, sometimes it gets confining and actually boring in the FBM.

Senator PASTORE. One must be built for it.

Secretary CHAFEE. Then we got the bonus we asked for.

AVIATION AND SURFACE OFFICERS

Aviation took a dive; it is on the way up. Surface officers, we are not doing very well.

ENLISTED MEN

Secretary CHAFEE. This is our goal for enlisted men. This is the end of their first enlistment, 31 percent. We have not been anywhere near close to it. When the Vietnam war was on and there were long deployments, it went down and then it took an awful dive here. Then we reversed it. Things are looking up.

We won't say we are home free but they are certainly encouraging.

The Marine Corps doesn't have such a high first term retention goal. Their results in retention are encouraging, too.

Senator ALLOTT. Mr. Chairman, what incentives are actually available to the man who reenlists after the first hitch?

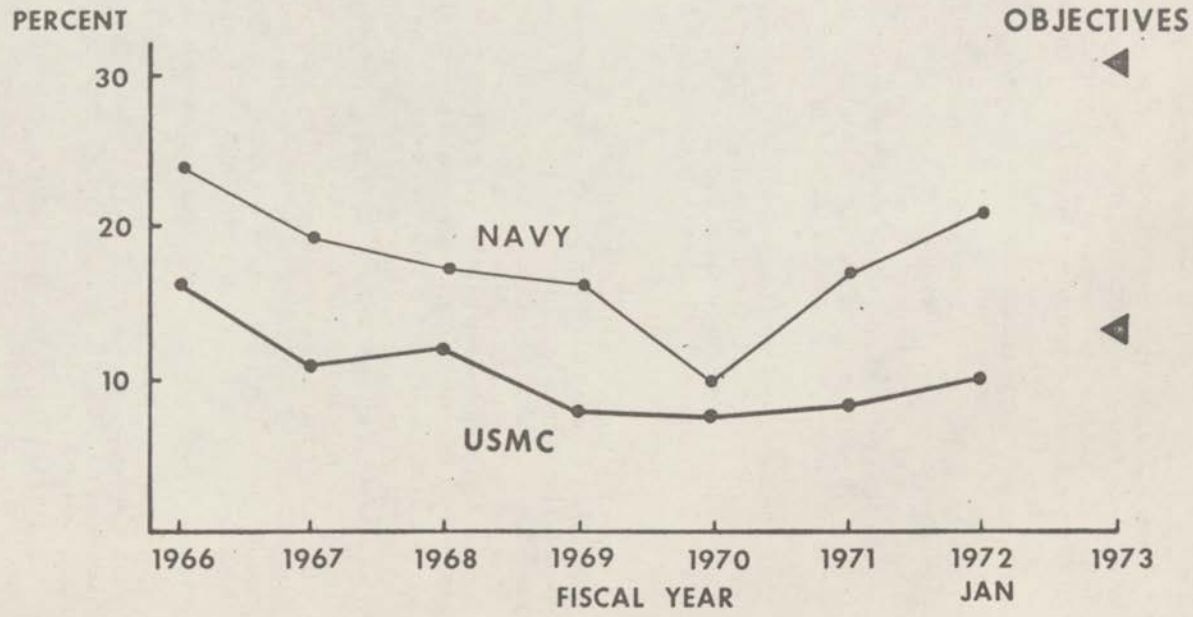
Secretary CHAFEE. He is eligible for the variable reenlistment bonus which can be as high as $10,000. He, of course, is working his way up so he is eligible for promotion. He is getting constantly better housing. He has the advantages that come with being in the service, such as medical and the commissary and PX, but those, of course, are not unique as far as reenlistment.

Senator ALLOTT. The only thing unique, as far as reenlistment is concerned, is the variable bonus.

Secretary CHAFEE. That is the only specific thing.

PERSONNEL RETENTION

FIRST TERM ENLISTED MEN REENLISTMENT RATES



SLIDE 10

Career Counselors

Senator Allott. How are you monitoring the efforts at the local units to be sure that maximum attempts are made to reenlist these men? I have run across several ex-Navy people, young men, who said no effort whatever was made to keep them in the service.

Secretary Chafee. That is surprising, Senator, because we have what we call career counselors in each squadron and each unit, and soon will have them on most ships.

Senator Allott. Who monitors the career counselors?

Secretary Chafee. The career counselors are monitored both from the Bureau of Naval Personnel and by their skipper, the Commander of their the unit. The purpose of these career counselors is not to come rushing up to the men the day the enlistment is up but to start talking to him some 6 months in advance of his discharge and discuss his future.

Furthermore, another thing which has been adopted, and Admiral Zumwalt is responsible for this, is much greater attention to the careers of these people through the Bureau of Naval Personnel. In other words, just like every officer has what they call his detailer, the enlisted man has somebody he can speak to on a higher level about his future.

Senator Allott. This is not peculiar to the Navy alone, although the young men I have talked with personally happened to be Navy personnel. However, I think it is very important that they feel they are needed, and there is a place and an opportunity for them. If this were conveyed to them adequately, it would spur a lot of them that I am sure are not being spurred at the present time.

Secretary Chafee. I agree with you 100 percent. That is what we call job satisfaction. We are trying to constantly improve it.

Admiral Zumwalt. Senator, every commanding officer considers it a personal challenge to have the highest possible reenlistment rate. One of the significant contributors to his own fitness report rating is the reenlistment rate on his ship. Therefore, it would be a very unusual commanding officer who has not done the most intensive possible job of trying to reach everybody on the big ship at least through his executive officer or through the head of his department.

Oversubscribed Ratings

Now, there are some ratings where we are oversubscribed and cannot reenlist everyone who applies. So that, some of these young men may have been in ratings where, for quality reasons, they are not offered the opportunity.

But I would appreciate it, as these cases come up, if you could send over to me the activity from which they came without identifying the man. I would like to look into that.

Senator Allott. The next one that comes up, I will.

Problems and Concerns

Secretary Chafee. Now, here are problems which we have not solved. The weapons one, too many bases as we come down in size. Merchant Marine problems you are familiar with. Environmental protection is going to be very expensive. We have done most of our shore stations and now we get to our ships. That is going to be extremely costly.

PROBLEMS AND CONCERNS

- INCREASING WEAPONS SYSTEM COSTS
- IMBALANCE BETWEEN SHORE SUPPORT AND OPERATING UNITS
- DIMINISHING SEALIFT CAPABILITY OF U.S. MERCHANT MARINE
- RISING COSTS TO SUPPORT ENVIRONMENTAL PROTECTION
- ALL VOLUNTEER FORCE

SLIDE 11

All volunteer force. Can we do it? We think we can. That is our challenge a year from now. We are putting everything we have into it.

Chairman ELLENDER. To what extent will that further increase your manpower cost?

I understand that today between 56 and 58 percent of your budget goes to pay for manpower.

Secretary CHAFEE. Not that much of the Navy's, but Defense, as a whole, that is correct. For the Navy, it is expensive; no question about it. We figure about 42 percent of our budget is for pay and allowance of civilian and military personnel. It will go up, particularly if we have these big pay raises.

Senator PASTORE. It will be as economical.

Secretary CHAFEE. We always say it will be economical because in theory you don't have to have as big a training establishment. Economical or not, it comes down to, you have to do it or you won't have the people. You can't have a volunteer force on the cheap. It is going to be expensive. Whether we can swing it, I can't swear to you that we can. Of course, this goes into effect July 1, 1973.

Chairman ELLENDER. In coming to the conclusion that you might be able to achieve it, you must have some estimates of the additional cost for a volunteer force.

Secretary CHAFEE. We are just operating on the cost we have now. In other words, the pay raises that have been in effect.

Chairman ELLENDER. I understand there is another pay raise in the offing next January.

Secretary CHAFEE. That is right.

Senator ALLOTT. Mr. Chairman, on this subject, the efforts of the Senator from Colorado on the pay raise last year resulted in some benefits in which the chairman of the committee did not think I showed the proper erudition, but, nevertheless, have these helped? Have the increases reached out toward achievement of an all-volunteer force?

Secretary CHAFEE. We really don't have enough data. We just think they are going to and they can't help but assist.

But, frankly, December and January aren't big enlistment months. So, it is hard for us to get the feel of it right now. We are keeping our fingers crossed and just hope that it will produce the goods.

Senator PASTORE. It is almost fundamental, is it not, that without substantial increases you could not achieve it?

Secretary CHAFEE. I think you can say that without a good pay raise for those incoming people we would have great difficulty getting them.

Senator ALLOTT. However, your charts do show an improved reenlistment rate.

Secretary CHAFEE. Yes. No question about that. Those charts I showed you were just the first termers. Once we have a fellow reenlist for the first time, in other words, when he has 8 years under his belt, there is 90-percent probability he will stay with us for a full career.

RETRAINING COST

Senator ALLOTT. We have had services testify before us, of course, for years, but one thing I have never seen in one of these hearings yet is the actual high cost to the Government of retraining.

You put a radar man on a ship; you employ a sonar man. You have to train these people. We have never seen any offset, in this committee, at least, I don't recall it, in saving by way of reenlistments which will be precipitated or encouraged by the raise in pay.

Do I make my point clear?

Secretary CHAFEE. That is why I say it should show up in reduction in our training establishment. The pay raises haven't been here long enough to effect retention to the point so that we can cut down our training.

We have a tendency, when we get less of a strain on our training establishment, to increase the length of training. Now, maybe this is wrong. For instance, we felt that the people we were sending out were not properly trained, say, during the height of the Vietnamese war. So, we have lengthened our training periods a couple of weeks.

Another problem we have is that we are constantly getting more sophisticated equipment, so just to train them for that is more difficult.

Senator PASTORE. Not only that, you have the greatly increased efficiency of the man who stays. He learns his job and he stays at it. Like these fine gentlemen who have been here, they have been with us a long, long time. The longer they stay, the better they are and the more we feel comfortable about their retention.

You have an enlisted man for 4 years and then he is discharged. All right, I think he has learned a lot that he can use in civilian life. That is true, and I think society gets the benefit of that.

Insofar as the military forces are concerned, the longer the man stays in this highly technical field, the more important he becomes and the more essential to us he becomes. You just don't measure this in dollars.

GREATER RELIANCE ON RESERVE COMPONENTS

Senator YOUNG. Mr. Chairman, if we got into another war like Vietnam, I think with this higher pay and higher cost, particularly higher pay, you would have to go to the reserves rather than the draft Army, particularly the Army. Otherwise, the cost would be impossible. I would think that, anyway.

If we were to build up a force of over 500,000 in another Vietnam and not utilize the reserves, you would have a very costly military organization.

Chairman ELLENDER. Proceed.

RUSSIAN EQUIPMENT

Secretary CHAFEE. Here is the other problem we have. What the Soviets are doing. They have good ships, good aircraft, as has been pointed out. They are expanding in all these different areas. Of course, you know about their submarine construction and what they are beginning to do with their so-called Yankee submarines.

PROBLEMS AND CONCERNS

THE SOVIET THREAT

- OUR MOST SERIOUS CONCERN
- TECHNOLOGY
  NEW, ADVANCED DESIGNS IN SHIPS, AIRCRAFT, WEAPONS
- EXPANDED ACTIVITY
  MEDITERRANEAN, NORTH ATLANTIC, CARIBBEAN, CENTRAL PACIFIC, INDIAN
- SUBMARINES
  OUTNUMBER U.S. IN ATTACK SUBS AND BUILDING MORE THAN U.S.

  HIGH PRIORITY TO SSBNS

SOVIET FLEET BUILDUP

Senator CASE. This may not be an appropriate time to raise a question about that particular area of Soviet improvement, but some time before the Admiral leaves I do want to ask him about statements he has made suggesting that this year we are going to drop below the 50–50 chance of beating Russians in a conventional war in 1973. I think this is a pretty serious thing. I want to ask questions about it at the proper time.

Chairman ELLENDER. I think Admiral Zumwalt will be able to answer this.

Senator CASE. Specifically, Admiral, the article that I am concerned about was in the Armed Forces Journal of February of this year.

Admiral ZUMWALT. That was an inaccurate record. The author has denied that he was given that number. The statement was not made to him, sir. You are familiar from our exchange last year of my views, however.

Senator CASE. I do know in a general way, but this is the year in which the Admiral is quoted as saying the U.S. Navy will become No. 2. The article goes on to state that you said the possibility that we could win a hot conventional war at sea with Soviets will drop below the 50–50 chance in 1973.

I take it that you just didn't leave the matter there. First of all, you say you did not say that?

Admiral ZUMWALT. [Deleted.]

Senator CASE. The Armed Forces Journal is a public medium and

if the public gets this idea. I think they also should know what you are doing about it. This kind of thing comes up all the time.

I was having lunch in New York the other day. Somebody said to me, "I had never worried about our position securitywise until I saw that the Russians had a plane, the Foxbat, that can go three times the speed of sound. We have nothing like it," suggesting that we were naked to our enemies.

The fact is that we are not naked to our enemies at all. We have a slower plane, but we have a missile that can catch these planes. This particular plane has a certain mission for which we do not need to supply a plane to fill in that same fashion.

The point is that the public becomes scared to death about this kind of supposition. There is a certain tendency, it seems to me, for this to be a somewhat cyclical matter which reaches a peak around this time of year.

Admiral ZUMWALT. [Deleted.]

Senator CASE, [Deleted.]

[Colloquy deleted.]

Senator PASTORE. Now you are talking about political questions.

Admiral ZUMWALT. Yes, sir. In my view, the reason for their having to back down has been that they faced the strategic nuclear superiority of the United States and the conventional superiority of the United States.

Take Cuba, for example. After the Kremlin leaders made their decision that they did not dare get involved in a strategic nuclear exchange, they had to make another decision to try to bull through conventionally and continue the support of the construction of these missiles. They decided they did not have the conventional power, and they backed down.

Senator PASTORE. I was amazed when I was in Europe—and I talked with many people there—that they were genuinely of the opinion that somehow, if they had a confrontation in Europe, it would be a conventional war and remain conventional. I could never understand that. I also felt it depended on whether we were winning or losing.

Do you believe that any confrontation of substance in Europe vis-a-vis the naval alliance and Russians, that it would be a conventional conflict?

Admiral ZUMWALT. I believe that the Soviets would always have to be very, very concerned about the possibility that a conventional war in NATO would lead to strategic nuclear war. The uncertainty is a restraining factor insofar as NATO is concerned.

[Deleted.]

Senator PASTORE. [Deleted.]

Senator ALLOTT. [Deleted.]

[Colloquy deleted.]

Senator PASTORE. That is why I raise the question.

Here we are talking about money and the big question here is security.

Senator CASE. This is no criticism of the admiral. It is his job to say what he thinks about a technical matter of this kind. I just want to be sure we understand what he means, so that we can go elsewhere where these matters have to be decided.

The question is whether we want to be superior, as the committee suggests, everywhere in the world, as we were in the Cuban waters.

Obviously we would still be superior in Cuban waters; would we not?

Admiral ZUMWALT. Yes, sir.

Senator CASE. We might not be somewhere else. Maybe in the Mediterranean, because of particular circumstances or something of that sort. It is really just a matter of understanding.

The peculiarity of the timing of the revelation in the Armed Forces Journal is the kind of thing I am interested in.

Admiral ZUMWALT. Senator Case, when this was shown to me, I had my office call the man. He has stated that he has never heard me say that figure. I will be glad to have you talk to him.

Senator CASE. I do not even question for a second that is so. [Deleted.]

Admiral ZUMWALT. I did not even say it off the record.

Chairman ELLENDER. Senator Young.

NUCLEAR AIRCRAFT CARRIERS

Senator YOUNG. Admiral, would you not feel [deleted] if we had carriers equipped, for example, with F–14's and other modern equipment now?

Admiral ZUMWALT. We not only need the F–14's on those carriers, but in my view we need the modernization that we get from the nuclear carrier we are pressing in this budget. And, we need to retain adequate carrier force levels. We have come from 24 carriers down to 16. [Deleted.]

Senator PASTORE. To [deleted].

Admiral ZUMWALT. Mr. Laird will testify that the [deleted].

Senator YOUNG. The planes you have now are no match for the latest of the Russians?

Admiral ZUMWALT. That is correct.

Senator YOUNG. The F–14 would be, though?

Admiral ZUMWALT. The F–14 is the only thing I know that can deal with the Foxbat aircraft. By the time we get the first one on board a carrier the Soviets will have on the order of [deleted] Foxbats operational.

OTHER U.S. AIRCRAFT AND BUDGET REQUEST FUNDING

Secretary CHAFEE. Mr. Chairman, we went through this last year, you will recall. My views have not changed at all. I disagree with the admiral's position. I think in the past year we have improved our position, our readiness. We have improved the types of aircraft that we have. I think there is an overemphasis on what the Russians are capable of. It is true they have more submarines than we have. In regard to the quality of our submarines and the training of our people I am convinced that we are superior to the Soviet Navy.

I think the advent of the P–3C aircraft, the F–4J's, the A–7E's that we have, give us an edge over the Soviets. So I don't subscribe to the admiral's position. As you recall, that is where we were last year at this time.

Senator YOUNG. I think this is a healthy discussion, when you two can disagree and put it on the record.

Senator PASTORE. Absolutely.

Secretary CHAFEE. I think the admiral would also stress that if he feels this way at this moment—you notice he said June of 1972—that this budget provides us with a capability which he believes will be a deficiency, I think it moves us ahead in great fashion.

Admiral ZUMWALT. Yes, sir.

Chairman ELLENDER. But it takes time to do that, plenty of time.

Secretary CHAFEE. Certainly it does. I certainly do not subscribe to that gloomy a view. I think there is a tendency to treat the Russians as 8 feet tall.

Chairman ELLENDER. No, 50 feet tall.

Secretary CHAFEE. I think they are very capable. They have good ships. They have well-trained people, but so have we. We have a lot of aircraft and ships.

AIRCRAFT CARRIER CONSTRUCTION

Chairman ELLENDER. Now, Mr. Secretary, will you justify for the record the construction of the new carrier? As was just stated, we have 14 carriers now and two more are under construction. That will make 16 altogether. In your statement you say that the plans are to have [deleted]. My position is this: If your plans are to have [deleted] you have, I think, eight or nine *Forrestal*-type carriers, you have the *Enterprise*, and you have two that are being constructed, and then you have the *Midway* type on which you spent last year almost $200 million to modernize. Why can't you get [deleted] out of those 16 ships?

Secretary CHAFEE. Mr. Chairman, I think there is a very important point. I think you know when I have come up here in the past. I have been lukewarm for some of the carrier proposals we have offered but I am not lukewarm on this one.

Let me give you the reasons why. You have to look at the ages of these ships. Now the Admiral pointed out we have 14 attack carriers. Right now the *Ticonderoga* is 28 years old. The *Intrepid* is 29 years old, the *Hancock* is 29 years old. The *Franklin Roosevelt* is 27 years old.

Now a ship is just like the deacon's one-horse shay. At the age of about 25, and certainly at 30, just everything starts to go wrong with it. The pumps, the piping, the decks, the hull, the machinery, everything. I don't think anybody would suggest that we should keep a carrier in operation longer than 30 years. It just is not an economical proposition.

Chairman ELLENDER. In 1955, the *Forrestal* itself was commissioned; the *Saratoga* in 1956. Is that right? Then the *Ranger* in 1957, the *Independence* in 1959, the *Kitty Hawk* in 1961, the *Constellation* in 1961, the *America* in 1965, and the *Kennedy* in 1968. In addition, you have two new ones to be constructed, and the *Midway* that you repaired at a cost of almost $200 million lately.

Couldn't you select from the number [deleted] and save the construction of this new carrier for a future date?

Secretary CHAFEE. I think the best way to look at it is at those points when the new carriers come in to join us and when the old ones reach 30 years. As you can see, let us take the *Intrepid*, the

Ticonderoga, the *Oriskany* and the *FDR* at their 30-year point. The *Midway* we won't argue about for the moment because it did have that overhaul, as you recall. This is where the *Nimitz* comes in, they say in September 1973. I think that is optimistic. Here is the *Eisenhower* they say in June 1975. You can maintain 12 that are under 30. Maybe you can stretch out the *Midway* a little bit, say give it 5 years, and retain it until 35 years old because of that conversion. But here you get up to the new one we are talking about. This one here is CVN 70. So you get 12. If you stretch out the *Midway* you might have 13 for a little while but that would make 35 years old up to 1981.

Admiral ZUMWALT. We don't think it is feasible. Her machinery was not replaced when she got that modernization. She only has two catapults.

Chairman ELLENDER. You made repairs to the *Midway*. Would it not be feasible to modernize the others that you have, [deleted].

Secretary CHAFEE. Mr. Chairman, experts who know more about this than I do have just pointed out when you start repairing a ship that is 30 years old, it becomes almost as expensive as building a new one.

Chairman ELLENDER. The *Midway* modernization cost you under $200 million.

Secretary CHAFEE. It was very expensive and has not really been a total success.

Chairman ELLENDER. Consider the new one that you propose to build. I venture to say, before you are through with it, just to build the ship itself will cost in excess of a billion dollars. Then, when you add the aircraft, how much will that be?

Secretary CHAFEE. That will be another $620 million.

Chairman ELLENDER. Over a half billion dollars.

Secretary CHAFEE. Easily that.

FRIGATES AND OTHER ESCORT COSTS

Chairman ELLENDER. Then the four frigates. How much will that be?

Secretary CHAFEE. We are not asking for those.

Chairman ELLENDER. I know, but you are going to have to in the future. You are taking steps now which, in the future, are forerunners to the construction of four frigates. You are also going to ask for supply ships [deleted]. I predict that before you get through constructing [deleted] this will cost from nearly $3.5 to $4 billion.

Secretary CHAFEE. Mr. Chairman, the question is, Do we want a Navy? A Navy is expensive.

SUGGESTED POSTPONEMENT OF CARRIER CONSTRUCTION

Chairman ELLENDER. I want a strong Navy. I want the country to be secure. Certainly I do. But it is my sincere belief that you could postpone this CVN–70 as you have in the past and select from the ones you now have and the ones being constructed, [deleted]. It seems to me that you want these carriers in order to protect the sealanes, not only for the United States, but for everybody in the world.

Secretary CHAFEE. We want it for the best interest of this country. That is what we want them for.

Admiral ZUMWALT. What I want them for is to get us back [deleted] so that we won't have to go to war.

NEW TECHNOLOGY REQUIREMENT

Senator PASTORE. Not only that, we want to incorporate all the improvements that we have learned over the years. I think the *Enterprise* has eight reactors. This will have two, which is quite an improvement. It has better carrying capacity. It has more maneuverability. After all, let us face it, gentlemen, we are living in a time where our adversaries are catching up to us with modern ships. I realize if you want to be frugal about this, you could attempt to modernize the old ones. Everybody knows, even with an automobile, after you have kept it a certain number of years, you are better off to get yourself a new car, if you don't want to have it in the garage every week.

First of all, these old ships don't live up to the assignments of today, and can't. They just don't have it. They are 30 years old. It will take a long time before you can launch this nuclear carrier. I tell you frankly, gentlemen, you are living in a nuclear age. We had better make up our minds.

Chairman ELLENDER. You would do better to prepare for the nuclear age. In this budget we are trying to provide the nuclear capability and also prepare for conventional warfare.

Senator PASTORE. An ounce of prevention is worth a pound of cure. We have spent $30 billion a year in Vietnam and we are trying to avoid another Vietnam. That is where your money goes, when you fight.

Chairman ELLENDER. We should not have gone to Vietnam.

Senator PASTORE. That is true but we did. We spent up to $30 billion a year. We don't know where we are going to go next. What we are trying to do is to build up our military posture in order to avoid a confrontation. Gentlemen, you can't do it with tubs.

U.S. SEAPOWER MISSION

Senator CASE. Mr. Chairman, I realize I started this, but I am very much interested. I don't think it is anything we can conclude here. These witnesses represent an arm of the Defense Establishment which is a part of the foreign policy in the broader sense, of the Nation. As you define your own goal, you have to meet your own objectives. What has fascinated me is what those objectives are and when you say [deleted] do you mean a world war or a war in a particular place?

What I am really saying, as I think about it, is that we probably have too little discussion of this rather than too much. If you had said what you told us last year, that would be fine, but I think you ought to go a good deal further [deleted]. You made it clear that we could still hold our own in nuclear war and in many other parts of the world as well. I don't quite know yet what you mean by all over the world. Do you mean keep the sealanes open everywhere?

Chairman ELLENDER. That is in his statement. The reason he wants this is to protect the trade routes.

Senator CASE. How far that goes is not clear. For instance, in the Mediterranean. I suppose we could have some kind of Scorpion that could shoot everything out of the water, which could be a specialized operation not involving a great task force of ships. If the Russians came up with some small device which was able to knock all our ships out of the water, I suppose we could also develop that, if we wanted to in that particular area for that particular purpose.

Admiral ZUMWALT. Our problem is that in the Mediterranean the Soviets have acquired bases on the southern littoral, the eastern littoral, and they already had them in the northeast. They have, on the average, a presence of [deleted] submarines and a good many surface ships in the Mediterranean. The submarines, the surface ships, and the aircraft flying from the bases represent a dramatic increase in power at a time when we have made dramatic reductions in our power [deleted].

Chairman ELLENDER. I don't want to extend the argument, but we were in command of the whole Mediterranean at one time. We had all of North Africa. We had Japan, Okinawa, the Philippines, Taiwan, and Western Europe with us, also. The reason that was done was to try to contain Russia. That is the reason.

Senator CASE. Is it not true, Mr. Chairman, and gentlemen, that our absolute supremacy in the world is a rather new phenomenon? This is a rather small period in our history. Our history is only a couple hundred years old or less. Is it a desirable thing that we should be able to defeat anybody or any combination that could be brought against us anywhere? Should that be our strategy? Self-protection is one thing, but to try to run the whole world, is that a desirable strategy? Is that a possible strategy, or would it just lead, as the chairman many times has indicated, to provoking the other side to stronger become——

Chairman ELLENDER. Keep up the arms race.

Senator PASTORE. Yes, but it is not a question of whether or not you can win the war. The big question is whether or not you can hold your primacy in other areas of relationship. As you become weaker, the other side becomes more arrogant, more aggressive, more possessive. This is tied into one ball of wax—you lose economically, you lose your position in the world and you may weaken your position in the foreign relations, too. I don't think we ought to police the world. I agree with the chairman on that. As has been said here, I think we would have to double our military posture if we are going to defeat everybody in the Atlantic, in the Indian Ocean, and in the Pacific. But that is not the question.

Senator YOUNG. Could we have Admiral Zumwalt's answer?

Admiral ZUMWALT. What I believe is not new, sir. I believe that we have to go all the way back to the days of Rome to find a case where European continental power achieved the capability to control the seas. Maritime nations: Portugal, Spain, Holland, England, the United States, have in turn controlled the seas for their allotted times. Napoleon never was able to dominate the world because he never got control of the seas. What we are seeing happen is the country that dominates Eurasia is in the process of achieving the power to control the seas.

Now the chairman of the Joint Chiefs of Staff in his statement will tell you that they have a formidable capacity, particularly in their

large and varied antiship missile forces, to attack our seapower and to sever our sealines of communication. I agree with that.

I believe that at the rate the Soviets are going it will continue to extend until the day comes when they have a capability to sever our sea lines from the Indian Ocean. These support our flow of POL from which, as I have said earlier, we will require 50 percent of our imports by the 1980's.

Chairman ELLENDER. I read that in a statement you made, but as I said, we will be doing that to support the whole world and not merely our own requirements. Admiral Zumwalt, I have been in Western Europe many times and talked to people looking down the mouths of the cannon, right next to Russia. They don't have the same feeling toward Russia as we do by any means. If they did, they would help themselves more than they do.

Admiral ZUMWALT. Senator Ellender, in World War II, you saw ships being sunk off the coast of Louisiana and elsewhere around the continental United States. You will recall that the English were within 3 weeks of having to surrender. This was despite the fact that in World War II our principal adversary started off with a submarine force that was a very small fraction of the potential adversary today. This is what could happen to us if the United States/U.S.S.R. relative force trends continue.

Chairman ELLENDER. Of course, you are figuring on a land war in Europe.

Admiral ZUMWALT. No, sir. I say that whether you believe it is going to be a land war or whether you believe it will be exclusively relegated to the sea, the same thing is true. Every plan we have in our basket rests on the assumption that the sea lines of communication make it possible to deploy the Army, Air Force, and Marines. Ninety-four percent of everything that has to go in to support them has to travel on the surface of the sea.

"MIDWAY" MODERNIZATION

Chairman ELLENDER. We could argue this all day. I want to go back to our discussion of the *Midway*. This is what was stated when the *Midway* rejoined the fleet:

> *Midway's* conversion was the most comprehensive modernization ever made to a U.S. Navy ship. She will be capable of handling the largest and most complex carrier aircraft and weapons system in the Navy's arsenal through the 1980's.

Now I say this: If you are able to do that with the *Midway*, why can't you do it with some of these other ships? In this way you could have the [deleted] that you say you need, because your CVN–70 is not going to be ready for another 8 or 10 years.

Secretary CHAFEE. That is right; it won't be ready for certainly 8 years. Mr. Chairman, I don't know where that press release came from but the *Midway* is currently 28 years old. We have deducted 5 years from it for this very expensive overhaul. So maybe the *Midway* will last until, as that press release says, into the 1980's but her limited capabilities will not meet the threat of that period.

Chairman ELLENDER. This is a news release issued by the Department of Defense.

Admiral ZUMWALT. 1980 is as long as we feel we could get useful life out of the *Midway*.

Secretary CHAFEE. The *Midway* in 1980 will be 35 years old. I think even with complete overhaul that is as long as she can go.

SEARCHING FOR PRIORITIES

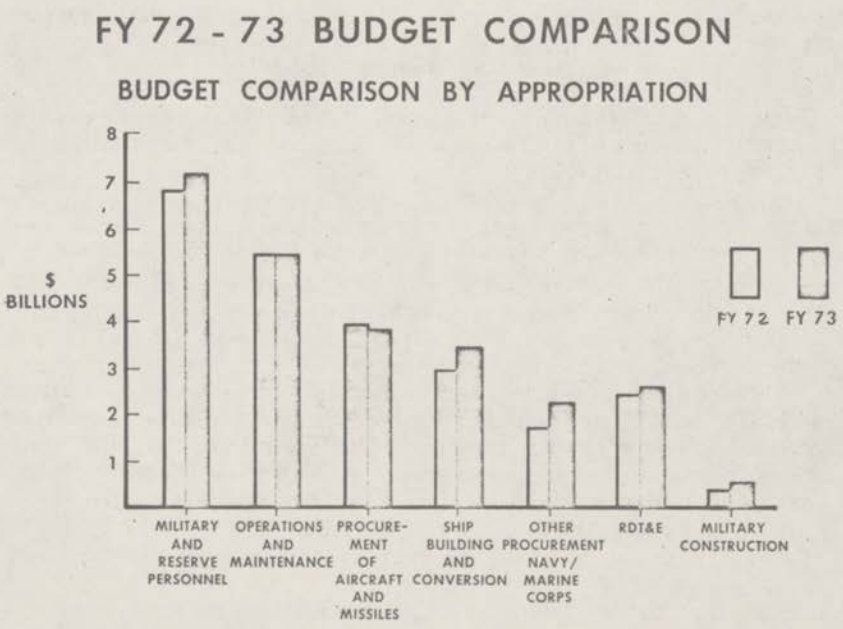
Chairman ELLENDER. Mr. Secretary, I think this committee and the Congress will have to make some difficult decisions in acting on the Department of Defense appropriation bill for fiscal year 1973. The Navy is requesting funds for the new carrier that we have been discussing which will cost over $1 billion, and for the acceleration of the ULMS program the total cost of which will be over $10 billion. The Air Force is proposing several very expensive programs such as the AWACS, the Advance Airborne Command Post, and, of course, they want to go ahead with the B–1 bomber. The Army is continuing to push for an expansion of the Safeguard ABM system, and they want to get ready for the production of the Cheyenne. I do not believe that we can obtain funds for all of these programs.

Secretary CHAFEE. That is our job to explain that to you, Mr. Chairman.

Chairman ELLENDER. Proceed, Mr. Secretary.

1972–73 BUDGET COMPARISON

Secretary CHAFEE. This slide shows the budget comparison between the year we are in and the budget we presented to you. You can see that the cost of military personnel goes up because of the pay increases. Operations and maintenance cost the same. What we are spending for aircraft and missiles goes down a little bit whereas shipbuilding goes up.



Part of the increase in shipbuilding is due to ULMS and part of it is due to the sixth submarine (SSN688). As you recall, you gave us long leadtime funds for six submarines last year so we are going for the sixth.

(Slide 14)

FY 73 BUDGET

SHIPS PROCUREMENT
(20 NEW SHIPS AND 9 MAJOR CONVERSIONS)

- 7 DD-963 DESTROYERS
- 6 SSN-688
- 2 PATROL HYDROFOIL MISSILE SHIPS
- 1 PATROL FRIGATE
- 1 DESTROYER TENDER
- 1 SUBMARINE TENDER
- 2 RESCUE AND SALVAGE SHIPS
- 6 POSEIDON CONVERSIONS
- 2 DLG AAW MODERNIZATIONS
- 1 SUBMARINE TENDER CONVERSION

SHIP CONSTRUCTION

Secretary CHAFEE. Now what do we get out of this budget? We had some discussion before on getting more ships. This budget provides for $3.6 billion for the SCN account. This is what you get for it: Seven destroyers, six 688 class submarines, which you have urged us to get. Patrol hydrofoils, two of them; and one of the new class of patrol frigate (PF). The PF is a cheaper escort. By cheaper, I mean between $50 million and $55 million.

Chairman ELLENDER. I realize that this patrol frigate is not nearly as large as the guided missile frigates that are used for the protection of our carrier; however, could this ship be used for that purpose?

Secretary CHAFEE. Well, they are not ideally suited for that. They would be more for escort of amphibious vessels, escorts for convoys, commercial convoys. They are a little too slow to keep up with the carrier, certainly at high speed.

Senator CASE. What is the range?

Secretary CHAFEE. The range is 4,500 miles at 20 knots. The 963 destroyers have [deleted] mile range at the same speed.

Whenever the crunch comes we have always cut out tenders. We are getting to the point where we really can't wait any more years.

RESCUE AND SALVAGE

Two rescue and salvage ships are included. This budget provides continuation of Poseidon conversions and one submarine tender conversion. This latter is to go from the Polaris to the Poseidon. Also included in this account is the long leadtime for the new carrier, $299 million, plus some money for the ULMS. Most of the money for the ULMS is R. & D. This includes some money for the ULMS under the shipbuilding and conversion.

(Slide 15)

FY 73 BUDGET

AIRCRAFT PROCUREMENT

- 66 ASW (24 P-3C, 42 S-3A)
- 36 ATTACK (24 A-7E, 12 A-6E)
- 7 ELECTRONIC WARFARE (EA-6B)
- 30 V/STOL (AV-8A)
- 48 FIGHTER (F-14)
- 8 EARLY WARNING (E-2C)
- 24 TRAINERS (T-2C)
- 8 TRANSPORT
- 5 SUPPORT (LC-130R)
- 20 GUNSHIP HELOS (AH-1J)
- 24 UTILITY HELOS (UH-1N)
- 6 EXECUTIVE HELOS (VH-53)

282

AIRCRAFT

Secretary CHAFEE. How about aircraft? We are only requesting a total of 282 aircraft. We have an active fleet of some 7,000 aircraft. So you can just see, with an average of 10-year life, you would have to procure 700 per year to hold even. Assuming average aircraft life of 20 years you would have to procure 350 each year. Due to fiscal constraints we are able to plan on only 282.

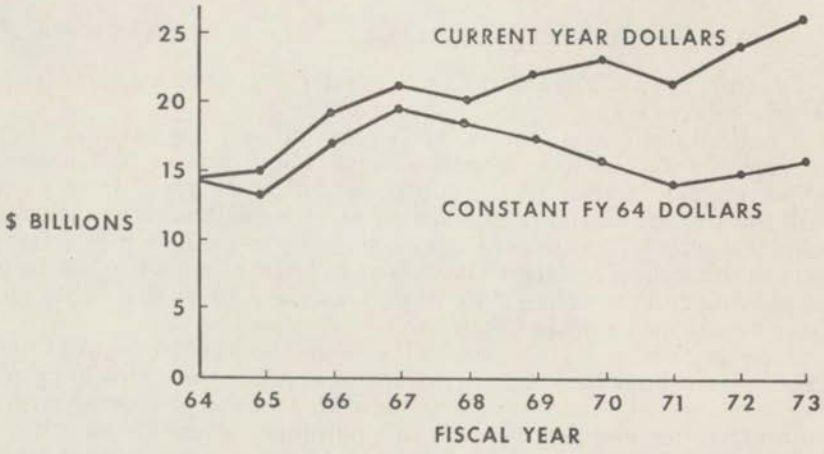
Here they are a total of 66 ASW aircraft. You are familiar with the P–3C's which are excellent. The S–3A is also an excellent ASW aircraft which will be carrier based.

The V/STOL is the Marine Harrier. This list includes 48 F–14 aircraft. You might have some question about the six executive helos. Those are for the White House, executive branch.

(Slide No. 16.)

DEPARTMENT OF THE NAVY BUDGET

TREND IN CONSTANT DOLLARS



INFLATION COST

Secretary CHAFEE. Here is what is happening to the Navy budget. The overall department budget for Navy and Marines is going up in current year dollars. If you wring out the inflation this is what it looks like. In constant dollars it is a good deal less than 1967, the peak year of the war expenditures. It is a little bit above the last peacetime year, which was 1964.

Chairman ELLENDER. That is because of inflation?

Secretary CHAFEE. Yes, sir.

(Slide No. 17.)

SUMMARY

- PROGRESS MADE TOWARD ESTABLISHED OBJECTIVES
- SOVIET PRESENCE AND CAPABILITY INCREASING
- OUR NEED TO USE WORLD'S OCEANS GROWING
- NAVAL FORCES PROPOSED IN FY73 BUDGET ARE MINIMUM TO SUPPORT NATIONAL POLICY

REASONABLENESS OF BUDGET

Secretary CHAFEE. In summary we have made progress. The Soviets are increasingly a serious challenge. In future years this country will rely even more on imports and exports. I feel that this budget is a reasonable and minimal one, particularly in the purchase of aircraft and procurement of new ships.

DURATION OF AIRCRAFT CARRIERS ESSENTIALLY TO FIGHTING FORCE

Senator YOUNG. Mr. Chairman, I wonder if I could ask a question which has been bothering me for some time.

I understand how a carrier can become old and obsolete and can't be repaired successfully beyond a certain age. But as to the need of an aircraft carrier in the future, say 10 to 15 years from now, will the aircraft carrier be a modern weapon or will other weapons be more powerful? The Russians seem to be going in a different direction. Do you think the aircraft will be an essential part of a fighting force 10 or 15 years from now, and if so, why? This is a question that is bothering many Members of the Congress.

Secretary CHAFEE. I can see why that would bother Members of Congress, particularly because it is so expensive. I have seen this happening in the world. We are reducing our own overseas presence. For instance, we just closed a base in the Philippines where we have been since 1904. We are being forced out of other places. So that our land bases are no longer available to the extent they previously were.

Now, if we want to have the capability to exercise our power under emergency conditions, in different parts of the world, say against interruption of supply lines of oil from the Persian Gulf, I think the aircraft carrier is the only way we can do it. In my judgment this will continue for the balance of this century.

Senator YOUNG. You don't think it will become so vulnerable, 10 years from now, that it can be easily destroyed by an enemy?

Secretary CHAFEE. I think anything can be destroyed by an enemy. I believe these carriers are extremely rugged. You know we had those terrible explosions in the *Enterprise* with major caliber bombs exploding. She took it even though nine of them exploded on the flight deck. She could have resumed action within hours after the debris was cleared. It didn't slow her up. Just like the airfields are vulnerable, carriers can be sunk, by somebody somehow. We feel we have built into them a tremendous strength and toughness.

Senator YOUNG. Do you think it will be an important part of a modern fleet 10 or 15 years from now?

CONSTRUCTION OF CARRIERS BY RUSSIA

Admiral ZUMWALT. Yes, sir; I do. I will make two additional points, Senator Young. I believe, as I predicted last year the Soviets inevitably have got to get carriers of their own. Because they came from behind, they optimized against our Navy by building submarines at a tremendous rate and surface ships with surface-to-surface missiles; and by picking up all the airfields they could get around

Eurasia. They are still picking them up, and will. But, they will reach the point where they must get tactical air out into the broad open ocean to fully establish this capability to interfere with our importation of petroleum, oil, and lubricants, and other strategic imports; with sea-based tactical air, and so that they can come to the assistance of satellites in Africa or Latin America. To achieve sea-based tactical air they have to have aircraft carriers. [Deleted.]

Carrier With V/TOL Aircraft

My view is that I would first try to get a carrier with V/TOL aircraft on it and then learn through operating that how to build a more sophisticated kind of carrier such as we have. These take much more operating expertise.

Vulnerability of Carriers

As my second point, I would like to say a word about the vulnerability side. I believe that first our carriers and amphibious task forces give us a superior capability to apply our power to the objective of our foreign policy. Our Marines, and the amphibious forces and carriers, enable us to project power overseas. The Soviets have always felt deterred from striking the carriers, I believe, because they recognized that we had a superior capability. We have to ask ourselves then the question how vulnerable are the carriers? Relative to the land bases, in a cold war our carriers are 100 percent survivable. We have lost land bases in a cold war. We have given up Sangley Point in the Philippines, Wheelus Air Force Base in Libya, and bases in Morocco. [Deleted.] There is a great difference in the relative availabilities of carriers and land bases in a cold war.

Shifting now to the vulnerability of carriers in conventional war—in the last two, Southeast Asia and Korea, carriers were not even attacked. They were acknowledged to be U.S. territory and had sanctuary although U.S. bases in South Korea were overrun. In Southeast Asia, we lost over 400 aircraft destroyed and 4,000 damaged on the land bases there.

Senator Case. We weren't fighting an enemy with airplanes.

Admiral Zumwalt. That is right, sir. They have had a few Mig's that they have used in Laos. They have never chosen to use them against aircraft carriers. They did have the capability to use surface ships if they had sought to do so.

World War II Attacks

My point is that relatively in those two conventional wars the carrier was not subject to attacks as were directed against land bases. You have to go all the way back to World War II to look at a conventional war where the carriers were being struck. There, the most modern class of carrier we had is now our most ancient class, the *Essex*. They were struck by the most intelligent form of guided missile we have ever had, the Kamikaze, as many as four times on a single carrier. An *Essex* class carrier was never sunk and with a single exception—*Franklin*—was always able to get back into action. As the Secretary

pointed out, there were nine bombs that exploded in the *Enterprise* fire, the equivalent of six or seven surface-to-surface missiles. Yet the *Enterprise* being of a class so heavily armored and compartmentalized and with so much redundancy, could have gone back into action in a matter of a few hours.

Nuclear War Effect on Carriers

Finally, let us consider carrier vulnerability in a nuclear war. In nuclear war, anything that gets a direct hit is destroyed. It is harder to hit a moving target than a fixed target. I would prefer to be standing on a carrier than on any land base in a nuclear exchange.

Contract with Litton for Construction of Destroyers

Chairman Ellender. I want to ask you something about the destroyers being built by Litton in Pascagoula. I was there about a year and a half ago. I gained the impression that they were having a little difficulty there in getting production started in their new facility.

On page 22 of your statement you say, "I am watching this situation"—this is about Litton—"very carefully but believe at the moment the best approach is for the Government to adhere strictly to the terms of the contract."

Are you finding any difficulty there?

Secretary Chafee. Yes, sir; the problem goes back further than the destroyers. As you know, Litton was the low bidder on those LHA's of which originally we were going to build nine and we cut back to five. Litton is having some problems with them and they are a year behind on those. The destroyers are what follow on the LHA's. It is too early for us to say that Litton is behind in the destroyers because they are not up to the cutting of the metal stage yet. But it appears from the design work that they are behind. I was down there about 2 months ago and they had projections that they could catch up on this design work, the detailed drawings. We cannot complain at this point because we cannot prove that they are behind on these destroyers, but they are certainly behind on the LHA's.

Chairman Ellender. Are they having trouble acquiring enough competent labor to proceed with this size contract?

Secretary Chafee. Yes. They have had trouble getting labor. They had quite a strike down there in September. As a result of the strike they increased their wages and they reported to me that since they have increased the wages they can get more help.

I was very much surprised, Senator, when I was down there that there is one of the few shipyards in the Nation that is doing any business to speak of, a private shipyard, and these tremendous layoffs in private yards in Bremerton and Long Beach areas, shipyard workers are very mobile, they all seem to have trailers and take their skills wherever they want to go. Yet they weren't taking their skills to Litton, to Pascagoula. So they felt that as a result of this wage increase that they granted after September, they are much more optimistic. I think we can say they are behind on the LHA's. On the destroyers we will just have to see.

(Discussion off the record.)

Chairman ELLENDER. Is there anything further, Mr. Secretary?

Secretary CHAFEE. That completes it, Mr. Chairman.

Senator YOUNG. You are a good witness. As a civilian you do very well with military questions.

Secretary CHAFEE. Thank you.

QUESTIONS BY SENATOR THURMOND

Chairman ELLENDER. Senator Thurmond was unable to be here today but has asked that responses to questions he has supplied will be answered for the record. The questions and answers will appear at this point in the record.

(The information follows:)

SHIP RETIREMENTS

Senator THURMOND. Secretary Chafee, does the Navy plan any further ship retirements and/or base or shipyard reductions this year?

Secretary CHAFEE. We have no plans for further retirements or reductions, during the remainder of FY 72, beyond that which the Congress has already been informed. There is always the possibility, however, that the fiscal climate could necessitate further adjustments between now and the end of FY 72. Rest assured that we will keep the Congress fully apprised should such exigencies arise.

STRENGTH REDUCTION SAVINGS

Senator THURMOND. How much money is saved when the Navy cuts its annual strength by one man?

Secretary CHAFEE. Based on the assumption that reductions to end strength equate to one-half manyear costs and that the reduction would mainly be accomplished by reduced accessions, the following MPN savings would be realized: Officer (½ man-year at ensign level), $4,870; Enlisted (½ man-year at seaman apprentice level), $2,725.

DECLINE IN NAVY PERSONNEL

Senator THURMOND. Since the Navy has fewer ships now, what effect has that had on personnel?

Secretary CHAFEE. The Navy's strength has been steadily declining since the end of fiscal year 1969 as shown in the following chart:

Fiscal year:	
1969	775, 869
1970	692, 660
1971	623, 248
1972 [1]	602, 196

[1] Projected strength.

PLANNED NAVY STRENGTH

Senator THURMOND. Mr. Secretary, what size Navy, personnel-wise do you envision for the next 5 years?

Secretary CHAFEE. Sir; current planning provides total Navy strengths of 602,196 for fiscal year 1972 and 601,672 for fiscal year 1973. We expect to remain generally stable for fiscal year 1974 through fiscal year 1976 with total Navy strength within 5 percent of the fiscal year 1973 figure.

UNDERMANNING IMPACT

Senator THURMOND. How did the 3,000 man personnel cut imposed on the Navy last year impact on your readiness and morale?

Secretary CHAFEE. The 3,000 man-year reduction caused a temporary undermanning which aggravated existing shortages with a concomitant reduction

in our readiness. Any strength reduction without a reduction in the tempo of naval operations results in increased personnel turbulence, heavier workloads for all personnel, and a commensurate reduction in efficiency/readiness in the fleet. Although no finite measure of readiness of morale exists, it is apparent that this reduction did have some adverse impact.

Senator THURMOND. What size cut could the Navy accept without significantly lowering readiness?

Secretary CHAFEE. The Navy could not accept a cut without significantly lowering readiness. A significant reduction of the shore establishment would soon be transmitted to operating ships and aircraft in the form of reduced services, degraded training and marginal logistic support. With the current high tempo of operations, exacting operational commitments and fiscal constraints, the readiness of operating forces would deteriorate, impacting on the strategy these forces were supporting. Broad and arbitrary changes to Department of Defense manpower will inevitably affect the national security posture.

CHIEF PERSONNEL PROBLEMS

Senator THURMOND. What are the Navy's chief problems in the personnel area?

Secretary CHAFEE. The Navy's chief problems in regard to personnel are recruiting and retention, personnel turbulence and Permanent Change of Station (PCS) restraints.

The first area I will address is recruiting. We have been operating in a virtually draft free climate since the fall of 1971. We have already experienced recruiting shortfalls. Recruiting will be our most challenging issue in the light that Fiscal Year 1973 will be a peak year in terms of recruiting. We are assisting our Recruiting Command by providing new programs and assigning top quality people for recruiting duty. The recent pay raises should also be helpful. Another major concern is retention. Low retention has had a major impact on personnel management and fleet readiness. We have experienced a very encouraging upturn in 1971 and 1972. However, we still have critically low retention in many skill communities and in middle pay grades.

Historically, our most effective single tool to improve enlisted retention has been the Variable Reenlistment Bonus (VRB).

Similarly the Nuclear Submarine Officer Continuation Pay, authorized in 1969, has reversed the downward trend in that community. Retention of nuclear trained enlisted personnel, who have no continuation pay presently authorized, is critically low—13 percent.

We continue to have serious problems in the retention of surface line and medical officers. We are below our goal in aviation officers but showing an upward trend.

Personnel turbulence, generated by force level, strength and budget reductions, and by low retention continues to inhibit optimum personnel management and fleet readiness.

The cumulative reduction we have experienced since 1969 has necessitated the inactivation or relocation of ships, air squadrons and shore stations. This has made it necessary to transfer people and relocate units to maintain a balanced readiness posture.

In regard to our PCS situation, we have implemented steps designed to reduce the required number of moves. The preponderance of the required PCS moves, however, entail accessions, separation, the movement of organized units and PCS training which must be accomplished. Any cuts in PCS funds will force us to severely reduce the deserved sea/shore rotation of our career personnel, as well as create training backlogs, gapped billets and further personnel imbalances and instability throughout the fleet and shore establishment.

COORDINATION OF STOL/V/STOL PROGRAMS

Senator THURMOND. Mr. Secretary, is the Navy coordinating with the Air Force in the STOL and V/STOL development programs?

Secretary CHAFEE. Yes. As an example, liaison between the Navy and the Air Force offices concerned with STOL and V/STOL developments has resulted in a coordinated plan in the area of propulsion components leading to systems that could be used for V/STOL aircraft. However, beyond some common ground in

propulsion, present Navy and Air Force requirements differ. The Navy's interest is in the development of tactical aircraft to operate from the proposed Sea Control Ship in the fighter, attack, anti-submarine and anti-missile roles. The Air Force program relates to a medium weight transport aircraft. The dissimilarity of the requirements, therefore, precludes a complementary or coordinated effort in total system development.

Marine Helicopter Gunships

Senator Thurmond. Mr. Chafee, why does the Navy need assault helicopter gun ships as called for in the Sea Cobra program?

Secretary Chafee. This is the Marine Corps helicopter gunship and its mission is the enroute escort and protection of troop assault helicopters, landing zone preparation immediately prior to the arrival of assault helicopters, and landing zone fire suppression during the assault phase.

Subcommittee Recess

Chairman Ellender. We will recess until 2 o'clock.

(Whereupon, at 12 o'clock noon the subcommittee was recessed, to reconvene at 2 p.m. the same day.)

(Afternoon Session, 2 O'Clock, Wednesday, February 23, 1972)

DEPARTMENT OF DEFENSE

Department of the Navy

STATEMENT OF ADMIRAL ELMO R. ZUMWALT, Jr., USN, CHIEF OF NAVAL OPERATIONS

PRESENTATION FORMAT

Chairman Ellender. The subcommittee will come to order. The next witness is Admiral Zumwalt.

Admiral, we have discussed quite a few of the points that I presume you are going to raise, but repetition won't hurt.

Admiral Zumwalt. Maybe I can do a better job the second time around.

Mr. Chairman, it is a pleasure to appear before you in support of the Navy's budget request for fiscal year 1973.

Again this year, Admiral Moorer, in his statement, presents a thorough exposition of our national nuclear deterrent forces. I shall therefore discuss the naval component of these forces only in connection with our ULMS program, for which we request a substantial increase in funding in fiscal year 1973.

UNIQUE ROLE OF NAVAL POWER

In his statement, the Secretary of Defense will elaborate on the total force concept and particularly on how our defense planning fits within the Nixon doctrine and the strategy of realistic deterrence. As he will make clear, with the advent of nuclear parity, general purpose forces, those of our allies as well as our own, are increasingly meaningful for deterrence in the types of situations which we as a nation and as a partner in several alliances may face in the next decade. Mobile, flexible forces are the key elements of such forces.

In some situations, naval forces, including amphibious forces with embarked Marines, the only forces that can be brought to bear quickly and effectively without dependence upon forward bases, overflight or landing rights or other support requiring the consent of territorial sovereigns. They provide a "signal" coupled with power, yet permit the exercise of restraint.

JORDAN CRISIS

The 1970 Jordan crisis provides a unique example of the utility of such Navy/Marine Corps forces. [Deleted.]

(Slide No. 1) [deleted].

Rapid Reinforcement

Naval power, including an amphibious force with embarked Marines was close at hand—available—and capable of rapid reinforcement.

Likewise, in the event of hostilities we must recognize the inescapable reality that assured control of the seas is the indispensable element of a strategy which envisages military support of allied forces or the employment of military forces overseas. Here again, conventional naval forces—in the sea control role—are the key element in making our strategy a success.

Nixon Doctrine: Honoring of Commitments and Greater Ally Contribution of Manpower

Chairman Ellender. Admiral, I recall when this incident took place. I wonder why it is that people seem to look to us to settle almost everything that develops. When there is an earthquake, let us say in Chile, we are the first ones there. They all look to us for assistance. I wonder why?

Admiral Zumwalt. Mr. Chairman, I would say that they tend to look toward one or the other of the super powers. Some look to us, others look to the Soviet Union. In the priority ordering of the world, I think our national interests are enhanced if more of them look to us as their friends than look to the Soviet Union.

Chairman Ellender. You think that is a good policy for us to pursue?

Admiral Zumwalt. I believe in case of disaster certainly it is well for us to provide help. In the case of a military situation, I, of course, only back up what the President has enunciated in his doctrine—that we will honor our treaty commitments but expect our allies increasingly to provide a greater contribution of the manpower required.

U.S. Landing of Ships at Lebanon

Chairman Ellender. In the case of Lebanon, I don't recall any treaty agreement that we had with Lebanon.

Admiral Zumwalt. No, sir.

Chairman Ellender. Yet we went there and endangered our forces. It cost a considerable amount.

Admiral Zumwalt. I was not in any position of responsibility at the time. But, as I read the history, sir, I think there is a distinct probability that Lebanon would have been a satellite state today instead of a free state if that had not been done.

Chairman Ellender. Was Russia involved in this?

Admiral Zumwalt. I think the judgment was that she was getting herself involved at the time; yes, sir.

Chairman Ellender. Who made the attack?

Admiral Zumwalt. You remember, the political situation was deteriorating internally. President Eisenhower was requested to provide forces to stabilize the situation, because the people in authority in Lebanon thought that the Soviets were likely to be invited in otherwise.

Chairman Ellender. That was just a supposition that they would.

Admiral ZUMWALT. I assume it was the judgment of the President at the time. That is as I read the history. I was not in on it.

Chairman ELLENDER. It is a great pity that the Russians do not make big grants to help these people, just to find out how ungrateful people can be after one helps them.

Admiral ZUMWALT. They are making grants, sir.

RUSSIAN ASSISTANCE TO AND REWARD FROM EGYPT

Chairman ELLENDER. Russia took part in the construction of the Aswan Dam. Were they to extend their aid to the degree the United States has done in so many countries, it would be interesting to see their reaction to the treatment they would inevitably receive from their beneficiaries. The manner in which the United States has been treated by many of those nations it has helped should prove a warning to them.

Admiral ZUMWALT. In the case of the Soviets, Mr. Chairman, they have been well rewarded for their investment in Egypt. They have been given the opportunity to construct a naval base at Mersa Matruh. They have the Egyptian air fields from which to fly the Soviet aircraft. They have made a significant improvement in their military and strategic position.

Chairman ELLENDER. You will recall that, after there was objection in this country to American financing of the Aswan Dam, Russia offered aid. This was extended to military assistance. Having gained entry by this method, they have since improved their military presence in Egypt.

Admiral ZUMWALT. They have made a series of steps to nail down their presence increasingly tight. Most recently, they concluded a 15-year Treaty of Friendship and Cooperation.

U.S. AND RUSSIAN PRESENCES IN MEDITERRANEAN

Chairman ELLENDER. We have been in the Mediterranean Sea for a quarter of a century. I have contended that it is because of our presence there in trying to control that whole area that Russia became so involved there. That is my opinion.

Admiral ZUMWALT. As you know, Mr. Chairman, my opinion is that we got there because the Soviets were overrunning Europe after the war and that the Marshall Plan and NATO came into being to stop the Russians rather than the converse.

EMBRACEMENT INTO NATO OF GERMANY AND JAPAN

Chairman ELLENDER. I would prefer not to argue the matter, Admiral Zumwalt, but I believe that, whatever the cause, the allied action in Europe in attempting to place a ring of steel around Russia in the early 1950's undoubtedly had its effect on subsequent Russian action. You will recall the reluctance with which France permitted Germany to become a part of NATO. You will also recall our utilization of Japan as a forward base. Both of these countries had been enemies not only of the United States but of Russia. Since then there has evolved

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a series of actions and counteractions on the part of both us and our adversaries. These have escalated to a point where, today, I fear we may well drain our finances to a point in which we could destroy our own economy.

HISTORY OF ASWAN DAM CONSTRUCTION IN EGYPT

Senator ALLOTT. Mr. Chairman, if I may I would like to add a little bit to the history of what has been discussed. I want to talk about Europe, too, but I want to go back to Egypt. You will recall that we were starting to build the Aswan Dam for the Egyptians. I recall very well the instance when Senator Wayne Morse stood on the floor of the Senate and said we would never put another dollar in the Aswan Dam if he had to stand on that floor until he died, or words of similar strength and import. We pulled out. So in this instance we did permit the Russians, rightly or wrongly, to go in and invest economically. They followed that up with a military investment which, as Admiral Zumwalt pointed out, netted a tidy geopolitical profit in that area.

RUSSIAN CONTROL OF EASTERN EUROPE: NATO DETERRENT TO RUSSIAN THREAT

I know how the Senator feels, but I am here, too, and I just have to point out that we were not ringing the Russians with any kind of a ring of steel at all. When World War II was concluded, no matter whose fault it was or who called the signals or who failed to call the signals, the facts are, if you look at a map of Europe prior to World War II, it is hard to find any political identification with the map of Europe as it exists today. Latvia, Lithuania, and Estonia were all taken by the Russians at the conclusion of the war. The Russians have political control farther south: complete military control of East Germany, practically complete political control of Poland, Rumania, Hungary——

Chairman ELLENDER. Czechoslovakia.

Senator ALLOTT. Czechoslovakia, though not to the same extent. Albania is the only independent country alined with the Communist nations. The Russians made an attempt to overthrow Greece. We intervened and stopped that. As a result, even though it is a dictatorship, we do not have a government which is an arm of the Russian Government. So, at the end of World War II we were not trying to surround them with a ring of steel. We were only surrounding them with a deterrent, a threat that I think was very, very well identified at that time. Those of us who did try to identify it at that time were not listened to very strongly.

If the Russians are surrounded by a ring of steel in Europe, it is because of something that they did. We did not take Czechoslovakia. We did not take Poland. We did not take Estonia, Latvia, Lithuania, and Hungary.

They have denuded some of those countries to the point, ethnically, where it practically consists of genocide. In Estonia and Latvia perhaps as much as 50 percent of the population has been displaced by Russians.

I suppose it is the interpretation you put on this, but I think we were reacting to what was a very, very serious and real Russian threat at that time, one I must say in honesty that I felt even before I got home from the South Pacific, and I do not think that we have generated an escalation of arms in this country which calls upon us to indulge in self-flagellation or self-incrimination for the positions we have taken in the world. I just don't feel this way. I know the Senator does not agree with me, but on the other hand, since these things have been said, I feel that I have to put this in the record because this is the way I feel.

Russian Fear Generated by Embracing of Germany Into NATO

Chairman Ellender. What we could have done and should have done is to try to neutralize Germany, and thereby remove some of the fear and suspicion that grew out of our efforts to embrace Germany, which only a few years before had killed, captured, and imprisoned 20 million Russians.

Russian Embracement of East Germany and Shipment of Modern Plants to Russia

Senator Allott. Except that Russia at the conclusion of the war had already embraced the greatest part of Germany.

Senator Young. And we had shipped practically all these new modern plants—what was left of them—to Russia. I remember when Senator Bridges was chairman of the Appropriations Committee, he was successful in stopping a small portion of it, but the most modern tools of all kinds had already been shipped to Russia.

Russian Contribution to World War II

Senator Allott. I think you will find that the only thing that the Russians really furnished in World War II—and I will be subject to criticism and I will not back up on it, but I will be happy to be corrected—all you will find of a military nature, all that the Russians contributed substantively to the war was manpower, the Stormovik fighter—which was a heavily armed ordinary fighter—and slow tanks and large guns. Everything else was furnished by the United States, I believe.

Chairman Ellender. There is no doubt about that. We furnished the bulk of the fighting materials that Russia needed. They never seemed to have recovered from their losses in World War I. They had many of their troops killed by the Germans because they were not sufficiently prepared. They had tremendous manpower but Germany was better prepared.

Statement of Former Deputy Secretary Packard, Quoting Robert Frost: Inevitable World Conflict

Senator Allott. There is a statement in a speech I just put in the record today by Deputy Secretary Packard, retired, that I wish you would read, and particularly a quotation by Robert Frost, that con-

flict in this world is always inevitable despite the idealism of many of us that we would like to see it different.

Control of Communist Countries

I will conclude what I have to say with one observation. That is, Mr. Chairman, you are eminently correct in one respect. I think if we as a people could deal with the Russians as a people, what you say would be true. From the best information I have, there are approximately 200,000 members of the Communist Party in Russia. That is all. That is the government of Russia. That represents Russia. We are not dealing with the people, unfortunately. But we have to deal with the realities as they are.

In the last 3 or 4 days we have seen the President go to a country with which we have not had relations for many years. Some have thought that the Chinese should have turned out big crowds. This is very shallow thinking on their part, and I am surprised at some of the pseudo-Chinese experts who came out of the woodwork at the last minute, but the Chinese could have produced 5 million people, or 10 million people, if they had wished to welcome the President to Peking. But it is just a handful of Chinese who make these decisions, just as there is a handful in Russia who make the decisions there. If we could deal with the people of Russia, I would agree with you, but we have to deal with the people who exercise the control, and it is kind of control that neither you nor I have ever lived under, nor do I think that we really understand it, no matter how hard we try.

Recommended Effort to Know Russian People Better

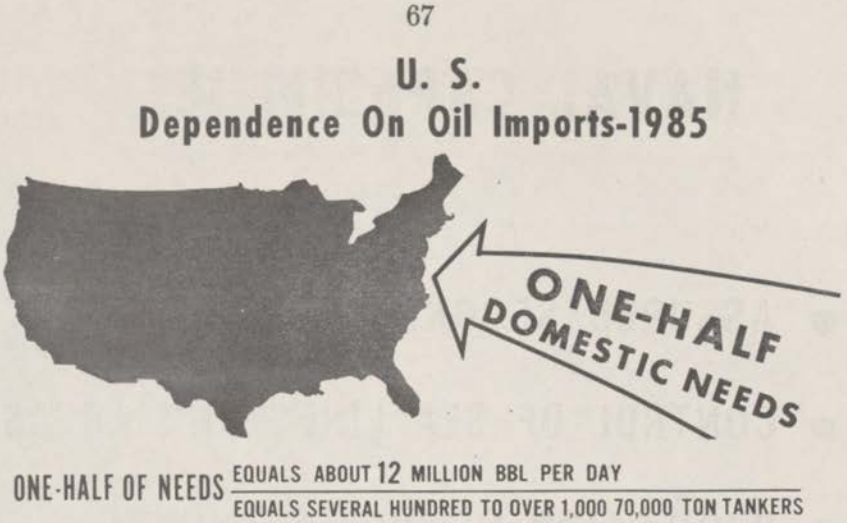
Chairman Ellender. The position taken by me, Senator, as you know, is that more effort should have been made by us to deal with the people of Russia, not the leadership, so as to make them envy us our way of life. There is no doubt in my own mind that, since the revolution in Russia, anybody who goes there and doesn't find great improvements is either blind or prejudiced. That is the reason I have been advocating a realistic exchange between us and Russia. I suggest we seek to have trade with Russia so that we can know each other better. I think a little effort in that direction would be much better than to spend billions of dollars ruining our economy, in order to prepare for a war which in my opinion will never happen.

Effects of Increasing Dependence on the Oceans

Admiral Zumwalt. Mr. Chairman, I have been discussing the more traditional roles of the Navy, but I believe a new one is emerging.

In the next decades, as technology improves, the sea is certain to become a major source of the world's resources. It is already becoming a valuable asset and hence a disputed one, not only for what can be pumped or mined from below the seabed, but for what can be done with the sea itself.

No one can deny the trend; the question is entirely one of time. One peacetime use of the sea that will be vital to our economy is certain to be upon us soon.



RECENT AND FUTURE TRANSPORTATION BY SEA OF PETROLEUM

Admiral ZUMWALT. During the past year, it has become increasingly clear that, by 1985 or so, we will have to import perhaps half of the petroleum we need. The quantities imported by sea will be vast—on the order of 12 million barrels a day. This will require from several hundred to over 1,000 tankers, each of 70,000 tons, fully committed to deliveries of oil to the United States. The potential for coercion of the United States, with or without allies, inherent in this situation is ominous when one considers the measures the Soviets are taking to improve their Navy.

Because of the utility of conventional naval forces in so many roles, I wish to devote the major portion of my posture statement to be a status report on how we stand vis-a-vis our most likely adversary and our progress on the programs we have initiated to improve our relative situation.

Senator ALLOTT. Isn't it true, Admiral, that recently as 5 years ago our oil imports were at 25 percent of our needs?

Admiral ZUMWALT. I will have to provide that for the record, but I believe that is approximately correct.

(The information follows:)

In 1968, the United States imported 1,038,397,000 barrels of crude oil and refined petroleum products. The total domestic demand for petroleum (all oils) in the United States in 1968 was 4,872,804,000 barrels. Therefore, imports of oil (crude and refined products) amounted to approximately 21 percent of domestic demand for petroleum products in 1968.

Senator ALLOTT. As recently as 3 years ago they were 33 percent, and now they are at 40 percent?

Admiral ZUMWALT. Yes, sir; and they will be up to 50 percent in the early 1980's, I believe.

Senator ALLOTT. If we go that long.

Admiral ZUMWALT. Yes, sir.

PRESENT SITUATION

Last year I outlined for you the current capabilities of the Navy with respect to four naval capabilities: Assured second strike; control of sea lines and areas; projection of power ashore; and overseas presence.

NAVAL CAPABILITIES

- ASSURED SECOND STRIKE
- CONTROL OF SEA LINES AND AREAS
- PROJECTION OF POWER ASHORE
- OVERSEAS PRESENCE IN PEACETIME

RUSSIAN MARITIME POWER GROWTH

Admiral ZUMWALT. The last three categories constitute the Navy's contributions to this Nation's conventional deterrent and war fighting capability. Last year I pointed out the rapid growth of Soviet maritime power in these categories in relation to our own strength. A few of the key indicators from last year are shown on the next two slides.

This shows you they built 237 percent of the number of ships we have built. If you look at tonnage in the field of major combatants and submarines, it is 36 percent more tons. The right-hand shows you they have increased by four-fold the number of missile platforms they can bring to bear in 10 years. The left-hand bottom slide shows they have overtaken us in number of merchant ships and will overtake us in tonnage in the next year or 2.

(Slides Nos. 4 and 5.)

1971 RUSSIAN SHIP CONSTRUCTION

Admiral ZUMWALT. The trends indicated here have continued. For example, during 1971, the Soviets added [deleted] missile ships, [deleted] to their naval inventory. They accelerated production of Yankee class ballistic missile submarines. Last year, they produced a total of [deleted] nuclear submarines of all types.

These additions indicate a continuing effort to upgrade the Soviet Fleet. Here are some other recent indicators of this trend:

(Slide No. 6.)

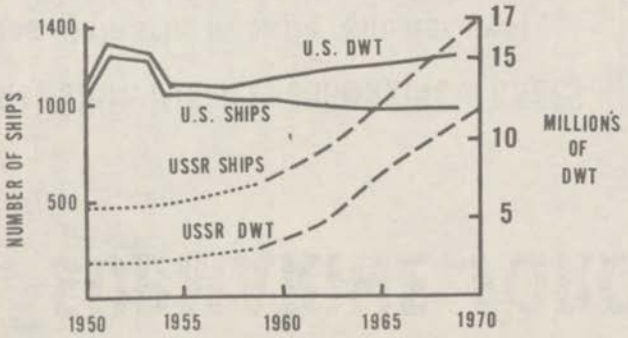
U.S. vs USSR GENERAL PURPOSE NAVAL SHIP CONSTRUCTION 1966-1970

	U.S.	USSR	USSR/U.S.
MAJOR COMBATANTS	9	20	222%
MINOR COMBATANTS	28	138	490%
AMPHIBIOUS SHIPS	24	10	42%
ATTACK SUBMARINES	27	41	152%
TOTAL	88	209	237%

GROWTH IN SOVIET MISSILE LAUNCH PLATFORMS

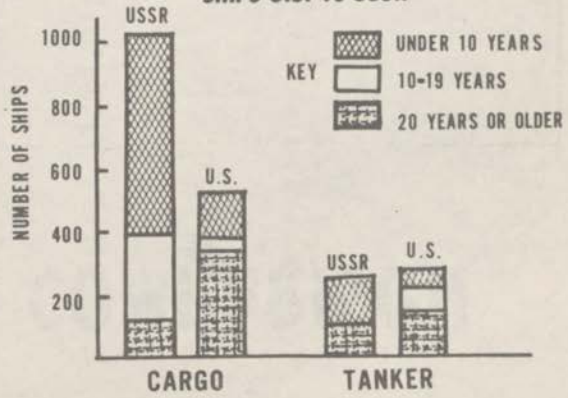
	1960	1970
MAJOR MISSILE WARSHIPS	6	20
MISSILE PATROL BOATS	6	160
CRUISE MISSILE SUBMARINES	0	65
SOVIET NAVAL AVIATION (SNA) BADGER AIRCRAFT	145	Deleted
TOTAL	157	
LONG RANGE AVIATION (LRA) BEAR AIRCRAFT		75

U.S. AND USSR MERCHANT FLEETS



DATA FOR U.S. REFLECT ONLY PRIVATELY OWNED VESSELS

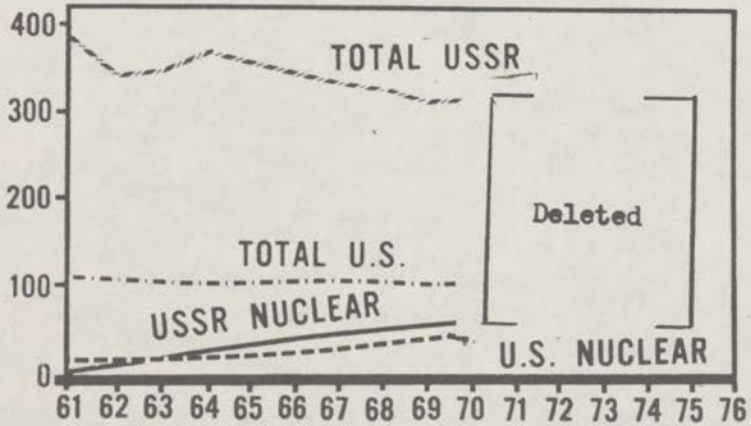
AGE/TYPE OF ACTIVE MERCHANT SHIPS U.S. vs USSR



SUBMARINE FORCE COMPARISON

ATTACK/ANTI-SHIP MISSILE SUBMARINE FORCES

(Excludes Ballistic Missile Submarines)



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OTHER INDICATIONS OF CONTINUING SOVIET NAVAL BUILD-UP

- NEW TYPES OF ANTI-SHIP MISSILES HAVE BEEN IDENTIFIED
- NEW SAM's ON SEVERAL SIZES OF COMBATANTS
- TESTING OF A SEA-LAUNCHED BALLISTIC MISSILE
- OPERATIONAL DEPLOYMENT OF A NEW 25,000-TON FAST UNDERWAY REPLENISHMENT SHIP (AOR)
- PRIORITY TESTING OF "BACKFIRE", A VARIABLE GEOMETRY WING, MILE-RADIUS, JET BOMBER
- MAJOR UPGRADING OF SOVIET SHIPYARDS

Admiral ZUMWALT. [Deleted] new generations of antiship missiles have been identified.

New SAM's have been mounted on several sizes of combatants.

A [deleted] sea-launched ballistic missile was tested in December.

A new 25,000 ton fast underway replenishment ship (AOR) has been deployed.

[Deleted.]

Backfire, a variable-geometry wing jet bomber, with [deleted] mile radius, is undergoing high-priority tests.

Soviet shipyards are being upgraded substantially.

POSSIBLE RUSSIAN CONSTRUCTION OF TACTICAL AIRCRAFT CARRIER

[Deleted.]

Chairman ELLENDER. What is the intelligence that you speak of?

Admiral ZUMWALT. [Deleted.] I should provide the exact words for the record.

(Classified material was submitted to the committee.)

Chairman ELLENDER. I have them here from, I guess, the same source you obtained yours.

[Deleted.]

Admiral ZUMWALT. That is essentially what I have said.

Chairman ELLENDER. Admiral, it seems to me that [deleted.]

Admiral ZUMWALT. Mr. Chairman, that is not accurate. The Navy would feel it needed this carrier [deleted.]

Chairman ELLENDER. The same as we did?

U.S. RELINQUISHMENT OF FOREIGN LAND BASES

Admiral ZUMWALT. We are in the process of giving up land bases.

Chairman ELLENDER. Why?

Admiral ZUMWALT. Under the Nixon doctrine, we are committed to the policy of a reduced profile overseas with no reduction in the degree of our commitments.

Chairman ELLENDER. Does the Nixon doctrine envision giving up all bases abroad?

Admiral ZUMWALT. No, sir, but it visualizes reducing overseas forces. We are in the process of doing so.

Chairman ELLENDER. We lost these bases. We were in a sense driven from them. We no longer have the bases built in North Africa. We were told to get out.

Admiral ZUMWALT. Yes, sir. Under our democratic way of life we don't overule an ally.

RUSSIAN FOREIGN LAND BASES

The Soviets would never let that happen to them in Egypt. That is the difference in the way in which we live. The Soviets will hang on to their bases.

Chairman ELLENDER. You mean the ones they have built?

Admiral ZUMWALT. Yes, sir.

Chairman ELLENDER. Do you think they will without the consent of the Egyptians?

Admiral ZUMWALT. Yes, sir, in my judgment they will see to it that the government in Egypt continues to support them one way or another.

Chairman ELLENDER. I think they were given quite a slap by the Sudanese in the Egyptian Sudan.

Admiral ZUMWALT. Yes, sir, because they didn't have a large presence there. The people were able to avoid the Soviet Bear before they let them in. I don't recall any case except Austria they have ever given up once they came in.

Chairman ELLENDER. Since Russia is in that area, do you think one is on sound ground to say that we ought to let the Russians carry the whole load, feed the people, take care of them, and keep ourselves out of this entirely?

Admiral ZUMWALT. No, sir, I do not. I think the consequences of that policy would lead to a situation in which the maritime nations of the world would proceed first to neutrality; and then, to rapprochement with the Soviet Union.

The Soviets could then be able to reorder the economic life of this group in such a way as to pump resources into the Soviet Union. I believe they would use economic pressure to deny us access to the oil markets of the world, to the strategic minerals of the world, and we would be brought to our knees economically if that policy continued.

Chairman ELLENDER. That is your sincere, honest opinion?

Admiral ZUMWALT. Yes, sir.

RUSSIAN GUIDED MISSILE CRUISER FORCE

Chairman ELLENDER. Proceed.

Senator YOUNG. Mr. Chairman?

I would like to ask a question. You mentioned guided missile cruisers. Are the Russians going more to guided missile cruisers than we are as a fighting force?

Admiral ZUMWALT. Yes, sir, we have built no cruisers since World War II with the exception of the nuclear cruiser *Long Beach* [deleted].

Senator YOUNG. Isn't a ship like that a very potent fighting vehicle? It seems to me it would be.

Admiral ZUMWALT. Yes, it is, tremendously so. These ships being equipped with surface to air missiles and surface to surface missiles. They are literally bulging with offensive armament and they maintain a real capability to apply their power.

Senator YOUNG. Why do we depend more on carriers than on the guided missile cruisers then?

Admiral ZUMWALT. To date, the Soviets have been able to maintain the airpower they need by the acquisition of bases around the Mediterranean littoral, in the Red Sea [deleted]. In my judgment they are moving to try to get into the Indian Ocean [deleted].

Senator YOUNG. Their needs are different.

Admiral ZUMWALT. Yes, sir.

RUSSIAN SHIP CONSTRUCTION WHICH MAY BE CARRIERS

Senator CASE. You mentioned carriers [deleted]. Is there any reason why huge aircraft carriers are better? Is one big aircraft carrier better than three or four small ones?

Admiral ZUMWALT. [Deleted.]

LARGE CARRIER ADVANTAGES

Senator CASE. I wondered why several small carriers are not better than large ones on the ground that they need less protection and there will be less danger of destruction?

Admiral ZUMWALT. Our problem, Senator Case, has been that we have to have bigger carriers in order to be able to operate the sophisticated aircraft of the type that we now take to sea in order to be able to deal with the land-based aircraft.

The *Essex* class is already too small, for example, to handle many of our carrier aircraft such as the A–6 and the F–14. Only the larger classes can handle those aircraft. Yet these aircraft are required to deal with the land-based threat. As I testified last year, Mr. Chairman, before the Senate Armed Services Committee [deleted].

Senator CASE. How long do you have?

Admiral ZUMWALT. I have 2 years and some months.

Senator CASE. It is renewable, is it not?

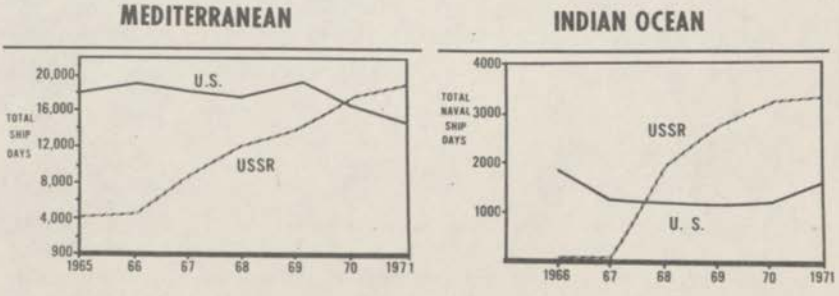
Admiral ZUMWALT. No, sir, not in my case.

(Continuing his statement.)

OTHER RUSSIAN NAVAL GROWTH

Soviet naval growth is not reflected only in new and improved hardware, however.

U.S. AND SOVIET SHIP OPERATING DAYS
MEDITERRANEAN AND INDIAN OCEAN



WORLDWIDE NAVAL DEPLOYMENTS: MEDITERRANEAN SEA AND INDIAN OCEAN

Admiral ZUMWALT. As I said last year, the rising strength of the Soviet Navy can also be seen in its large number of worldwide deployments, as, for example, in the Mediterranean Sea and Indian Ocean. During the Indian-Pakistani war, the number of Soviet naval surface ships in the Indian Ocean reached a high of 26. Another sign is the increasing sophistication of its fleet exercises, as demonstrated in Exercise Okean in 1970 and this past year in a series of summer exercises conducted by the various fleets. I am sure you recall seeing pictures of Soviet warships operating within a few miles of Hawaii.

(Slide 8 omitted.)

INCREASING VISITS OF NAVAL SHIPS TO FOREIGN PORTS

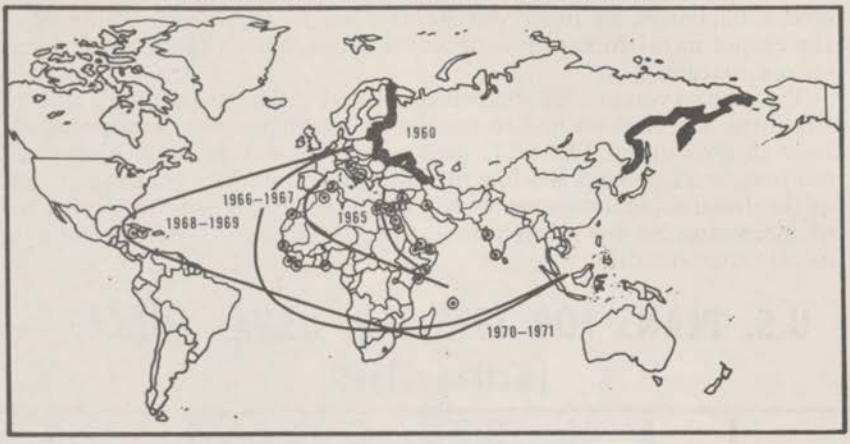
Admiral ZUMWALT. The year 1971 also saw major increases in the frequency of visits by Soviet naval ships to foreign ports and the continued use of naval forces as extensions of statecraft in the furtherance of foreign policy.

INCREASING RUSSIAN ACCESS TO PORTS AND AIRFIELDS

(Classified slide 9 deleted.)

Admiral ZUMWALT. The Soviet Navy suffers from one basic weakness—a lack o sea-based tactical air. It is therefore more dependent on land-based air support than we are. This deficiency is only partly compensated for by antiship missiles. Thus, the sea-based air power of the U.S. Navy, which is vital to both sea control and projection missions, marks a key difference between our Navy and the Soviets. They must compensate in the near term by access to ports and airfields around the world. They are doing this at an impressive rate as indicated in this slide.

SOVIET ACCESS TO
WORLD NAVAL AND AIR FACILITIES



10

RUSSIAN 12-YEAR GAINS AND U.S. REDUCTION OF OVERSEA FACILITIES AND PERSONNEL

Admiral ZUMWALT. This shows you the situation in 1960. The first overlay shows the reach they had obtained by 1965. The next one shows the additional reach they had achieved by 1967 and, finally, the reach they now have by the end of the current year.

Their ability to shape domestic public opinion or disregard it entirely makes it easier for them to plan such access.

I think that is one of the reasons their people feel as they do about us.

By contrast, since the mid-1950's the United States has reduced its facilities and personnel overseas, excluding Southeast Asia, by at least a third.

And you know how rapidly we are pulling out of Southeast Asia.

As I noted last year, we trace the beginning of the Soviet Navy's current spurt of growth to the Cuban missile crisis of 10 years ago. It is only within the past few years, however, that we have perceived the scope of that expansion. All along, we have underestimated it.

I think this is significant, Mr. Chairman. You hear people say we call the Russians 8 feet tall. The following slide indicates that we have been erroneously measuring them as 4 feet tall.

(Classified slide 11 deleted.)

U.S. UNDERESTIMATION OF RUSSIAN NAVAL FORCES

Admiral ZUMWALT. As you can see, except for conventionally powered submarines, we have consistently had to revise our estimates of the Soviet naval forces upward as the true scope of their buildup became apparent.

This shows you in 1967 we estimated in 1955 they would have 58 missile ships. By 1969 we had to change the estimate of what they would have in 1965 upward to 1967. And so it turns out we were 40 percent too low, or 21 percent too low or 29 percent too low. Only in the case of the diesel submarine were we too high. Despite the growing evidence of increasing Soviet naval power, the United States has reduced its naval forces steadily.

U.S. PLANS FOR 1975 U.S. NAVAL FORCES (Active Fleet)

	A	B	C	D		E
YEAR PLAN MADE	AIRCRAFT CARRIERS	AMPHIB ASSAULT SHIPS	ESCORT SHIPS	ATTACK SUBMARINES NUC	CONV	TOTAL SHIPS
1967	20	137	243	69	36	826
1968	21	99	238	68	37	793
1969	20	77	240	69	38	713
1970	15	67	205	68	19	578
1971	Deleted	Deleted	Deleted	Deleted	Deleted	Deleted

REDUCTIONS OF U.S. NAVAL STRENGTH PLANS

Admiral ZUMWALT. This slide shows the plans for U.S. naval strength for 1975, drawn up in 1967 and every year since. In every category except nuclear attack submarines, our current plan shows a reduction of [deleted] percent compared to 1967.

Admiral ZUMWALT. Every time they got bigger, we got smaller. In actual strength too, the budget you are considering provides for forces that are reduced below the levels of 1965; that is, before the Vietnam buildup: Ships, down 37 percent; aircraft, down 18 percent; military personnel, down 10 percent.

NAVY STRENGTHS: 1965 TO 1973

	1965	1968	1971	1972	1973
1. SHIPS	936	976	702	657	594
	-	(+4%)	(-25%)	(-30%)	(-37%)
2. VF/VA/VS/HS/VP AIRCRAFT SQUADRONS	138	135	111	110	114
	-	(-2%)	(-20%)	(-20%)	(-18%)
3. MILITARY PERSONNEL (THOUSANDS)	672	765	623	602	602
	-	(+14%)	(-7%)	(-10%)	(-10%)
4. CIVILIAN PERSONNEL (THOUSANDS)	315	395	331	317	311
	-	(+25%)	(+5%)	(+1%)	(-1%)

13

CIVILIAN PERSONNEL REDUCTION AND BASE CLOSINGS REQUISITE

Admiral ZUMWALT. Only in the numbers of civilian employees, reflecting the situation in our swollen supporting structures, do we show no significant reductions. It is in this area that we shall have to make cuts this year and the next, and we ask your understanding as we find it necessary to reduce civilian personnel levels, close bases, or both.

POSSIBLE REVERSAL OF TREND: FUNDING REQUISITE

I recognize that comparing two Navies principally on the basis of numbers of ships, weapons, and aircraft may not constitute an accurate assesment of their relative strengths. Many intangibles must be considered—maritime tradition, battle experience, esprit de corps, battle readiness, logistic support and many other factors all play a part. In many of these areas the Soviet Navy is largely untested while the U.S. Navy has proven itself in World War II and the almost constant, high tempo operations, including combat, that we have conducted in the postwar years.

By coming along behind us in construction, the Soviet Navy has been able to optimize against us, as, for example, with large submarine forces and surface-to-surface missile forces. The U.S.S.R. has also acquired access to many land bases for her naval arm to add a third dimension to the naval power she can bring to bear against the U.S. Navy. As we modernize our forces, we now have the opportunity—and the challenge—to counteroptimize against them. The programs we have initiated—many of which are reflected in the fiscal year 1973 budget—are in many cases directed to that goal and, if supported by the Congress, will go a long way toward reversing the trend which I have been discussing.

EFFECT ON RUSSIA OF U.S. BUILDUP: IMPERATIVE TO MAINTAIN SECOND STRIKE CAPABILITY

Chairman ELLENDER. Admiral, what effect do you think this buildup of ours—which is, of course, known to the Russians—will have on the SALT talks?

Admiral ZUMWALT. Well, sir; with regard to the buildup I don't see that the Soviets see any buildup. The Soviets have not seen us build any strategic platforms for a number of years. A previous administration announced there would be absolutely no incentive for the Soviets to go beyond the numbers we had and we would therefore stop. The Soviets on the other hand have not complied with our guidance and they have proceeded to outbuild us.

Chairman ELLENDER. Was there any agreement of any kind?

Admiral ZUMWALT. No, sir. But we gave the evidence of good faith by stopping to build and have stopped to build for a number of years. It is true we have converted——

Chairman ELLENDER. What you did, though, was simply convert to better missiles.

Admiral ZUMWALT. Yes, sir.

Chairman ELLENDER. I think it was admitted here last year that we had enough missiles in place to destroy the whole world; so did Russia. Is that correct?

Admiral ZUMWALT. I don't believe that is accurate, Mr. Chairman. [Deleted.]

Chairman ELLENDER. You are going to take up ULMS later?

Admiral ZUMWALT. Yes, sir.

PROGRESS ON NEW INITIATIVES

Last year I spoke to you of several new initiatives that we were taking to offset the adverse effects of force reductions. I can now report significant progress in some areas, but I am dissatisfied by our slow progress in others. For your convenience, I have grouped these new initiatives in the same general categories as last year.

INITIATIVES INVOLVING MULTI-PURPOSE FORCES

- DUAL-PURPOSE CARRIER - CV CONCEPT
- MARINE CORPS AIRCRAFT SQUADRONS ON BOARD CARRIERS
- SUBMARINES [Deleted]

MULTIMISSION CARRIER–CV CONCEPT

Admiral ZUMWALT. I am happy to report that our pilot program on the multimission carrier, using *Saratoga's* recent deployment to the Mediterranean with a mixed air group—ASW and attack—proved the feasibility of this concept. As a result, we plan to confine [deleted] carriers as CV's, or multimission carriers [deleted].

MARINE CORPS AIRCRAFT SQUADRONS ON BOARD CARRIERS

Two Marine Corps aircraft squadrons have deployed on board attack carriers in the Atlantic and Pacific. They thus support our peacetime deployments; in certain combat situations, however, they would have to fly ashore to support their divisions. The carriers would then, of course, be short of aircraft. Or we would have to call up the reserves with less capable aircraft.

[Deleted.]

INITIATIVES INVOLVING CLOSE SUBSTITUTES

• WARTIME USE OF MERCHANT MARINE

• ALLIED NAVAL FORCES

WARTIME USE OF MERCHANT MARINE

Admiral ZUMWALT. Last year I reported a joint project with the Maritime Administration to study the use of merchant ships in underway replenishment and rapid deployment so that we will not have to devote so large a proportion of Navy shipbuilding funds to this category of ships. In the past year, we have progressed from the study stage to the test stage. Beginning February 10, we shall hold a 2-month series of tests in the Atlantic and Mediterranean, using an unmodified, unaugmented commercial tanker to refuel Navy ships.

ALLIED NAVAL FORCES

In the past year, I have met with the CNO's of 29 allied navies and have proposed to many of them additional cooperative measures to improve our common posture for sea control. I am following up these initial contacts, with the hope of establishing detailed cooperative arrangements. The navies of many of these allies are excellent, containing modern, capable ships, albeit in most cases in small numbers. In time of conflict they will provide valuable support for common objectives.

Maintenance of sea control in the broad reaches of the ocean will fall largely to the United States as our allies focus the major share of their expenditures on land-based forces.

Only 17 percent on the average go into the Navy. Nevertheless, the contributions of allied navies are significant, and we are seeking closer cooperation in many ways.

UNDULY HEAVY BURDEN OF UNITED STATES

Chairman ELLENDER. Admiral, in that connection, have you consulted them as to giving us assistance in maintaining the rest of the oceans? The Baltic Sea is relatively small and would not take as many ships there as elsewhere. Are we to police the rest of the Atlantic, Pacific, and the Indian Oceans? Is that what you advocate?

Admiral ZUMWALT. I am advocating that we be ready to work together if we end up in a kind of war where several countries are fighting together. If we don't, we, of course, can't count on them.

BRITISH SHIP CONSTRUCTION

Chairman ELLENDER. Are the British building any new ships?

Admiral ZUMWALT. The British are building new ships.

Chairman ELLENDER. Since when?

Admiral ZUMWALT. They have been building them right along, sir. They are in the process right now of completing some escort ships and they are in the process of designing and getting ready to build a through-deck cruiser.

Chairman ELLENDER. That must have been in the last 2 years.

Admiral ZUMWALT. I will have to provide for the record the specific year, but they do have an ongoing construction program, sir.

(The information follows:)

Looking at last year, 1971, as an example, the British brought into service two nuclear submarines; the first guided missile destroyer of a new class, and one general purpose frigate. Last year they had under construction three more nuclear submarines; the first of another new class of guided missile destroyer; two more general purpose frigates; four of a new class of fast frigates; and a new class of minehunter. The British started design work with their shipbuilding industry for a through-deck cruiser in 1970. That work is continuing.

EUROPEAN LAND AND AIR THREATS

Chairman ELLENDER. I learned the Italians were building two cruisers when I was there 2 years ago. Insofar as France is concerned, very little progress is being made. As for Germany, I tried to secure some information, but there was no evidence that they were intending to build any large contingent of ships. Have you any information for the committee?

Admiral ZUMWALT. Yes, sir; the first comment I will make is that

the southern NATO nations are facing 50 Communist divisions and 1,400 Communist aircraft. They therefore have got to worry primarily about land and land-based air forces. In the case of the northern nations they are facing seven Soviet divisions and 130 aircraft. In the case of the center NATO nations, they are facing 83 Communist divisions and about 2,000 aircraft. So, in every case they have to worry about the land and land-based air threat. As a result, NATO is putting on the average 83-percent of its assets into land and air rather than in the naval forces. They feel that it is reasonable for us to be the ones who provide the large fraction of the sea support while they provide the overriding percentage of their assets in the air and land-based components. They are, however, building new ships.

Chairman ELLENDER. If that is true, why should we need those five divisions there? Is it to encourage them? I am told it was to more or less encourage them, to show that we meant business, that we would help them in the event of conflict.

Admiral ZUMWALT. Yes, sir; the land divisions are required not only for military purposes but also to give them political confidence that we will be with them.

U.S. SHIPBUILDING REQUISITE

Chairman ELLENDER. You think that we should proceed at our own expense to provide the ships, other than what they are seeking to do now in the Baltic and in the Mediterranean Sea.

Admiral ZUMWALT. Mr. Chairman, I believe the best we can do if we get everything in this budget is to have some probability of success in maintaining the capability to bring our resources into this country and some probability of success in being able to reinforce our allies. [Deleted] So I do not feel we are in any sense advocating overwhelming power. [Deleted.]

ADDITIONAL ASSISTANCE TO ALLIES

Chairman ELLENDER. To what extent have you and others in the Joint Chiefs of Staff been advocating further assistance to our allies abroad?

Admiral ZUMWALT. I think we have all been advocating it very strongly, Mr. Chairman. An example: Just recently I appeared before a subcommittee of the Senate Armed Services Committee in support of the ship loan legislation which is badly needed to bolster up the navies of three of the Mediterranean NATO countries and Spain as well as Korea. We feel that this is a very good use of these ships, cheaper manpower provided by these allies, and they will use them very effectively, and they are better off there than they are being in our strategic reserve.

Chairman ELLENDER. I was somewhat alarmed last week when I saw a newspaper clipping that Mr. Laird took the position—I presume it was with the advice and consent of the Joint Chiefs of Staff—that in addition to spending funds to strengthen our own forces we must also help our allies.

Admiral ZUMWALT. Mr. Chairman, I believe the actual formulation of what Mr. Laird is saying is that we can't do it without our allies, that we must now count on a total force concept which includes counting on our allies, our Active Forces and our Reserve Forces. I believe if you read what he says it is pretty clear that we cannot do it alone.

Chairman ELLENDER. That, of course, is the same language I have been listening to for the past 25 years, to the effect that efforts

would be made to get our allies to help. But so far we have not succeeded.

Admiral ZUMWALT. Mr. Chairman——

Chairman ELLENDER. I mean in actually helping to maintain our forces abroad and in taking over some of the duties that we now have there.

Admiral ZUMWALT. The allies have been building new ships, new equipment, they are maintaining forces. One can argue about whether they are doing their full share. Some countries are spending more of their GNP than we are, others are spending less. So it is a question of which pot we call black and which pot calls us black, sir.

Chairman ELLENDER. Are you satisfied that the allies are doing all they can to help us?

Admiral ZUMWALT. No, sir; I believe the allies ought to be doing more, and I believe we ought to be doing more.

$1 BILLION EXPENDITURE BY NATO ALLIES

Chairman ELLENDER. As I have said, for the past 25 years, at least, I have been preaching that we should obtain more help from our allies. Every Secretary of Defense has stated that he has tried, and will continue to try. Is there any way by which we can force them to help us?

Admiral ZUMWALT. The recent announcement in NATO that they are going to increase their expenditures by a billion dollars is one example of the way in which Mr. Laird has been effective in getting them to dedicate greater resources.

Chairman ELLENDER. That is a drop in the bucket. The first billion dollars is to be spent over a period of 5 years to build infrastructures on their own territories with our help. What is the second billion dollars to be used for?

Admiral ZUMWALT. It is my understanding this consists of additional expenditures for forces as well as infrastructure and it is just for that period 1971 and 1972. It is a billion dollars for military equipment entering the service in 1971–72.

GERMAN NAVY

Senator YOUNG. Is Germany doing anything to improve its Navy? Do they have any kind of Navy?

Admiral ZUMWALT. Yes, sir. We gave them five World War II destroyers. Then they procured some DDG's. Recently they indicated an intention to go for smaller craft to replace the older destroyers, missile-firing craft.

Senator YOUNG. They are not building any ships of their own; are they?

Admiral ZUMWALT. They are building some small craft; yes, sir, and some submarines, small diesel submarines.

REDUCING SUPPORT COSTS

Admiral ZUMWALT. I have already indicated that our cuts in the shore establishment have not matched our cuts in forces. Although, in this respect, we have not made the progress I had hoped for, we have attained some economies by horizontal personnel cuts and staff consolidations and are still working hard on this. However, vertical cuts plus elimination of shore bases and consolidations of functions offer the only hope for significant additional savings.

MANAGEMENT INITIATIVES

- REDUCING SUPPORT COSTS
- RETENTION EFFORTS
- OVERSEAS HOMEPORTING (NEW)

Retention Efforts

Last year I said that every man we reenlist helps to reduce our extremely high training costs. In this area, I am happy to report substantial progress. You are aware of our continuing efforts to "humanize" the Navy. Although it is always difficult to tie together cause and effect, I can report that, during the period these measures have been in effect, we have seen our overall first-term reenlistment rates rise from less than 10 percent for fiscal year 1970 to an average of 17 percent for fiscal year 1971. For the first 5 months of fiscal year 1972, the figures are even more encouraging, averaging 20 percent. I must qualify these figures by pointing out that reenlistment in some critical rates is still dangerously low—less than 10 percent—far short of our 31-percent goal. On the junior officer category, retention of aviation and submarine officers has improved. However, our badly overworked and overdeployed surface officers are being driven out of the Navy at increasingly high rates.

OVERSEAS HOMEPORTING

This is a new item. Our studies have shown that homeporting additional fleet units overseas can, at reasonable cost, improve our overseas presence with limited forces and make possible an improved surge capability in time of crisis. Such a policy should also increase the time in home port for both CONUS-based and forward deployed units, increasing time with families, and thus will, based on previous experience, improve retention. We have already homeported a destroyer squadron in Japan and a carrier division staff in the Philippines, and we are working with OSD and the State Department to homeport a carrier group in the Mediterranean. [Deleted.]

Chairman ELLENDER. I think that is the program you discussed with me a couple weeks ago.

Admiral ZUMWALT. Yes, I did. I would like to emphasize that such forward-homeporting is consistent with the Nixon doctrine. The support facilities will be very austere. The families involved will live largely on the economy. The ships will continue to come and go as they always have.

INITIATIVES TO MEET SOVIET CAPABILITIES AND EXPEDITE MODERNIZATION

WEAPONS AND SENSORS

- CAPTOR
- HARPOON
- INTERIM SURFACE-TO-SURFACE MISSILE
- CONDOR
- LAMPS

DEFENSIVE SYSTEMS

- SIDE LOBE CANCELERS
- ACOUSTIC COUNTERMEASURES
- ANTI-SHIP MISSILE DEFENSE

NEW SHIP CONCEPTS

- SURFACE EFFECTS SHIP
- SEA CONTROL SHIP
- PATROL FRIGATE
- HYDROFOIL CRAFT

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WEAPONS AND SENSORS

Admiral ZUMWALT. I have broken down this category of initiatives in a slightly different way this year, to make this portion of my statement more easily understood.

CAPTOR

We are continuing development of this deepwater moored mine, which will fire an MK–46 torpedo against a submarine [deleted]. Initial operational capability (IOC) remains [deleted].

HARPOON

Development of this air- or ship-launched antiship cruise missile is proceeding well. The IOC is [deleted]. We are concurrently developing an encapsulated version, to be fired from submarines.

Interim Surface-to-Surface Missile (ISSM)

This is a temporary stand-in for HARPOON until the latter is available. IOC's are: Semiactive version now, an antiradiation version in [deleted]. We will place Standard SAM's, modified as ISSM's, on [deleted] destroyer escorts and [deleted] patrol boats this year. We have also added our DDG's and DEG's to the list of ships to get the [deleted] antiradiation versions of the Standard Missile. This dovetails with our plans for HARPOON, since the missile ships will be the last to receive that weapon in about [deleted].

CONDOR

This program to produce an air-launched, electro-optically guided standoff missile for use against heavily defended targets is moving on schedule. IOC: [deleted].

LAMPS

This helicopter system, which became operational late last year, will extend the radii of destroyer anti-submarine and anti-air-warfare capabilities.

DEFENSIVE SYSTEMS

SIDELOBE CANCELERS

These devices reduce vulnerability to jamming [deleted]. Fleet tactical aircraft have been provided with radar warning and homing devices.

Acoustic Countermeasures

We are continuing to develop [deleted].

Antiship Missile Defense

In this vital area of development, I can report measurable progress. The IOC of the VULCAN-PHALANX gun system has been advanced [deleted]. We have 80 Basic Point Defense Missile systems ready or in production. Installations will be made in 30 ships in fiscal year 1972. Infrared decoys, with demonstrated capability against actual missiles, are tested and ready for use. Follow-on development is in progress.

NEW SHIP CONCEPTS

As the slide indicates, we have also moved ahead with new ship concepts. I shall describe them later in the presentation.

Thus, I can report qualitative gains in several important areas. There has also been some improvement in fleet readiness. But these gains have not been sufficient to offset the effects of reduced force

levels nor to reverse the increasing relative strength of the Soviet Navy. Approval of the programs recommended in the fiscal year 1973 budget is required to counteract the unfavorable trend.

(Slide No. 18)

MAJOR SYSTEM PROCUREMENT PROBLEMS AND ACTIONS

- NAVY TIGHTENING MANAGEMENT
- BUT EXTERNAL FORCES OPERATING:
  - WAGE INFLATION
  - REDUCED AEROSPACE BUSINESS FORCES HIGHER OVERHEAD LOAD
- STRONG SUPPORT OF NEW SECDEF METHODS

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COST GROWTH

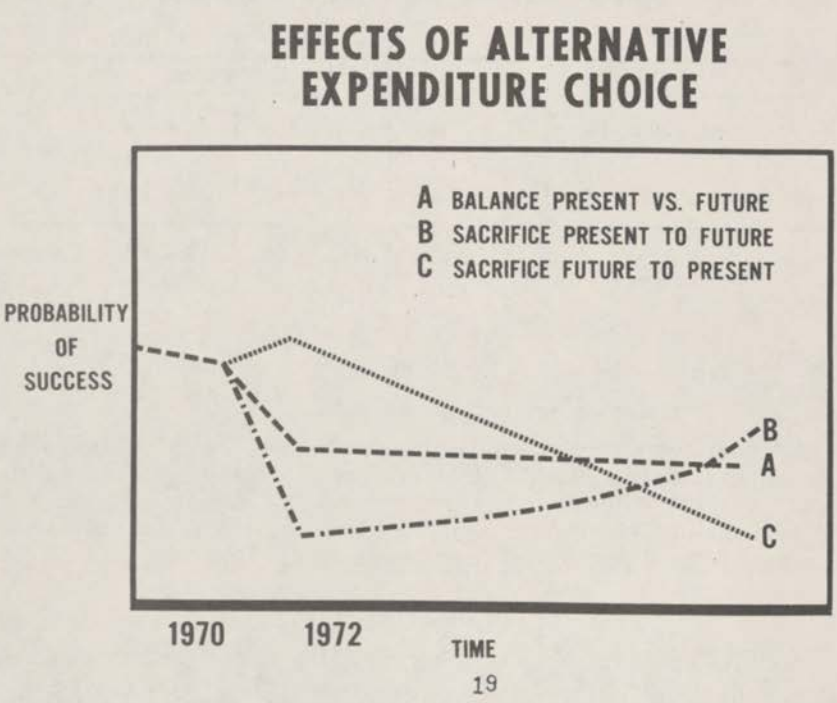
Admiral ZUMWALT. As you know, we are experiencing cost increases in some major procurement programs. We are deeply concerned about them, just as Congress is. We acknowledge that there is room for improvement in our procurement procedures, and we are working hard to manage our programs more efficiently. At the same time, some factors are beyond our control. Rapid increase in costs, especially in labor costs, and a decrease in the Government's overall procurement level, which increases the average overhead loading, have led to higher cost levels on new contracts and cost increases on contracts already in effect. As a consequence, the Navy is limited still further in its ability to procure the new ships and aircraft essential to its missions.

Much of the Navy's management talent has been concerned with the problem of how to fit the required acquisitions into a limited funding schedule, while maintaining a healthy aerospace and shipbuilding industry and keeping costs down. We hope that productivity will increase and that the industries concerned can adjust to new, lower levels of Government procurement, that procurement can be coordi-

nated better among the Services, NASA, and other Federal departments so that the industries can thus be stabilized. These measures may ease the cost pressure. In the meantime, however, we face a severe problem despite our efforts; we may be forced either to pay prices higher than anticipated by the Navy or to forgo acquisition of vitally needed ships and aircraft. For the future, we fully support the new procurement methods of the Secretary of Defense.

1973 PROGRAM AND BUDGET: HARD CHOICES

I shall now comment on our fiscal year 1973 budget and authorization request. Last year I showed you this chart, depicting the hard choices we had to make in arriving at an annual budget for the Navy. (Slide No. 19)



FUNDING THE FUTURE

Admiral ZUMWALT. This year is no different. We have to make many choices. This shows you we could have followed the route of reducing our forces even further, we could have followed the route of maintaining all our present force levels, done no modernization and reducing our probability of success catastrophically.

Instead, we have chosen the route of making major reductions in our force levels, taking high risk in the near years in the hope that if we get the support of Congress for additional programs we will be able to improve the probability of success in the out years. So we have had to to make choices. These include tradeoffs between the present

and the future—that is, between spending heavily to provide a greater capability today by keeping more older ships in service, or using more funds to procure new ships and aircraft thereby increasing future capability. We must also analyze the tradeoffs between greater sophistication of individual ships and aircraft—and consequently higher unit costs—and procuring greater numbers of less sophisticated, less expensive weapons.

The budget we are requesting for the Navy totals more than $23 billion. Within that total we have continued to emphasize the future. For the second straight year we are putting an increased proportion of our resources into future capabilities.

(Slide No. 20)

ALLOCATION OF NAVY BUDGET

	FY 71		FY 72		FY 73	
	AMOUNT	%	AMOUNT	%	AMOUNT	%
PERSONNEL & OPERATIONS	11.5	58.3	12.2	55.4	12.3	52.4
INVESTMENT & DEVELOPMENT	8.2	41.7	9.8	44.6	11.1	47.6
TOTAL	19.7	100	22.0	100	23.4	100

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PERSONNEL REDUCTION AND PROCUREMENT INCREASE

Admiral ZUMWALT. This shows you on the top line in the slide that personnel and operations, in other words, our current forces, have gone from 58 percent down to 52 percent in the last 3 years, whereas our investment in new aircraft and ships and research and development has gone from 41 percent-plus up to an excess of 47 percent.

SHIPS AND COMBAT AIRCRAFT

Admiral ZUMWALT. We are doing more R. & D. and are buying more new ships and combat aircraft. Unfortunately, this means fewer ships and aircraft in the fleet in the next few years. Even so the average age of our aircraft is increasing and of our ships is staying unhealthily constant.

We also strive for a balanced program that includes a mix of less sophisticated platforms—such as the patrol frigate, sea control ship, and guided missile hydrofoils, whose lower costs enable us to buy a greater number of ships—and the more sophisticated platforms and systems—such as the CVN–70, DD–963 class destroyers, 688–class submarines, and F–14 airplanes—whose unit capability is desparately needed, but whose high cost limits the numbers we can buy. These in combination with the larger numbers of less effective units provide the balance that will optimize our capability of being able to cope with the existing and predicted threat.

MAJOR ITEMS

Turning now to some of the major items in our request, I will comment briefly. Program sponsors, who will appear later, will deal with all the items in detail. Of course, if you have questions about these or any of our other programs, I shall be pleased to answer.

CVN–70

Admiral ZUMWALT. We are requesting $299 million for long lead-time items for CVN–70, the third nuclear powered aircraft carrier of the *Nimitz* class.

MISSIONS

The aircraft carrier has at least three very critical missions. First, it is an important part of our national tactical air capability. As we reduce our overseas land bases outside Europe in consonance with the Nixon doctrine, the aircraft carrier has become increasingly central to that mission. It has and will continue to be, in many cases, as in Vietnam in the beginning, and in Korea where our land bases were captured early in the war the only way we can bring air support to allies in need.

Second, the aircraft carrier is a necessary part of our sea control forces. As the Soviets have increased their ability to launch air attacks over wide ocean areas and bring surface combatant strength to bear, the aircraft carriers' role in controlling the sea has grown. If we are to be able to provide the vital energy and other resources from overseas needed to keep our economy going in the face of Soviet blockade, or if the U.S. forces are to be delivered to support our overseas allies in the face of opposition at sea, that is if we are to have any credible alliances, we will need carriers and modern ones.

Third, the carrier provides peacetime presence. As the number of our land-based forces deployed overseas declines, we will need to keep some evidence of U.S. power in sight. This will at the same time sustain our allies' confidence in us to demonstrate by our presence both our capability and our determination to protect our commerce and our sources of strategic materials from any interruption. Carrier peacetime deployments are unlikely to drop significantly.

I have just returned from the 6th Fleet and it is clear they are operating in the maximum fashion there consistent with fiscal restraint.

1980 FORCE LEVEL OF MODERN BROADLY CAPABLE CARRIERS

In 1980, when CVN–70 is ready to join the fleet, our force level of modern, broadly capable carriers will include only [delete] which will then be 33 to 35 years old. The four nuclear carriers, two each based in Atlantic and Pacific coastal ports, will provide for rapid reinforcement and contingency response. The nuclear carrier enjoys a high degree of logistic independence and can rush to areas of potential crisis at high speed. It arrives fully ready, with enough self-contained ordnance and aircraft fuel for full air operations. More than any other single new general purpose weapon system, CVN–70 will demonstrate

our capability and resolve to meet the challenge of the Soviets; it will serve as a visible and credible naval deterrent.

Highest Priority Item

I consider CVN–70 the item of highest priority in the conventional budget. Without it, we forgo any prospect of assuring our naval superiority in the late 1970's and 1980's.

Escort Vessels

Senator Young. What other naval vessels will maintain the speed of nuclear carriers?

Admiral Zumwalt. Our DLG's and DDG's, and coming out of Pascagoula, the DD–963 class will have the capability, sir.

Senator Young. Do you have these ships to accompany the carriers at this time?

Admiral Zumwalt. We don't have enough nuclear frigates and we will not have enough. We do not plan to buy any more. But we will have, if we get all of the 963's, those coupled with the existing nuclear frigates and DDG's and DLG's, enough to provide escorts for our nuclear carriers and do some marginal escorting of other forces.

Senator Young. Aren't your carriers accompanied by destroyers, too?

Admiral Zumwalt. Yes, sir; these are the guided missile destroyers, guided missile frigates, nuclear escorts.

Senator Young. Are they all as fast as the nuclear carriers?

Admiral Zumwalt. Yes, sir. The conventional ones have to slow down to be refueled. So, you lose time that way. The nuclear carrier has to give up some of its aviation fuel to fuel these ships. That is the disadvantage of not having nuclear escorts with them.

Completion Date and Cost

Chairman Ellender. If the money is provided for the carrier, when will it be constructed and ready for action?

Admiral Zumwalt. By 1980, sir.

Chairman Ellender. What is the estimated cost of the carrier on its completion?

Admiral Zumwalt. Including escalation for the 8 years that it will take to get it into the fleet, the estimate now is $951 million.

Carrier Aircraft Cost

Chairman Ellender. What is the estimated cost of the airplanes required for this carrier?

Admiral Zumwalt. I will have to provide that for the record but it will be on the order of $500 million. Those of course would be required whether on land or we would want those aircraft in any event, sir.

(The information follows:)

The estimated flyway cost of a typical 1980 multipurpose airwing for CVN–70 is $621.5 million.

INTEGRAL PROGRAM PARTS

Chairman ELLENDER. Yes; but you are providing them especially for these carriers, aren't you?

Admiral ZUMWALT. Yes, sir. I think, Mr. Chairman, the point is that together the platform, the aircraft, the escort should not be considered as there just to serve themselves but they are there to make it possible to support armies, air forces, marines overseas and to insure that we can bring fuel and resources into the country. In other words, that is the price one pays to be able to be sure we can support our economy and to prevent it from being blockaded as well as support our allies and our services overseas.

ESCORT SHIPS

Chairman ELLENDER. In the record there is a statement that to protect the aircraft carrier you must have four frigates.

Admiral ZUMWALT. It will take four nuclear frigates or——

Chairman ELLENDER. How much will those cost apiece? I want to get the entire cost.

Admiral ZUMWALT. Based on a decision that our Secretary has made that we will not build any more nuclear frigates, we are talking really about the cost of the 963 class destroyer. I will have to provide the estimate for the record.

(The information follows:)

Our current estimate of the average program unit cost is $90.6 million for each of the 30 DD–963 class destroyers.

COST PER DESTROYER

Secretary CHAFEE. That will be about $88 million, say $90 million per each DD–963-class destroyer.

Chairman ELLENDER. You don't intend to ask for the construction of additional frigates?

Secretary CHAFEE. Not for any nuclear frigates: no.

Chairman ELLENDER. The conventional frigates?

Secretary CHAFEE. Right. We will have those conventional frigates anyway. We don't build those ships solely to escort aircraft carriers. They have a lot of other missions that they have to accomplish.

Admiral ZUMWALT. We would need many more escorts if we didn't have the aircraft carrier.

Chairman ELLENDER. If you depend on that aircraft carrier in certain areas, I understood that you must have at least four frigates or other escorts to protect it.

Secretary CHAFEE. It depends upon the threat but in most wartime situations that would be adequate.

Chairman ELLENDER. You must have tenders to bring supplies.

Secretary CHAFEE. Yes; a carrier must be replenished at least every 30–60 days.

CARRIER PERSONNEL

Chairman ELLENDER. Next was the complement of the carrier. How many people would be necessary to operate this carrier?

Admiral ZUMWALT. On the order of 5,000.

Secretary CHAFFEE. That includes the wing; 2,500 for the ship and 2,500 to maintain the aircraft.

Admiral ZUMWALT. I should make the point, Senator Ellender, that we really have reduced the total manpower allocated to the aircraft carrier by virtue of having reduced from 24 carriers down to 16. As this nuclear carrier comes in, if we get it, [deleted]. Manpower in the net would go down.

Chairman ELLENDER. With a bigger ship, it will take more people to operate it.

Admiral ZUMWALT. There is a net saving in manpower.

Chairman ELLENDER. You mean instead of using the ones you have there now?

Admiral ZUMWALT. Yes, sir; instead of using the larger number that we have today.

TOTAL COST OF CARRIER ESCORT SHIPS AND EQUIPMENT

Chairman ELLENDER. What I was trying to establish, if I can, is the projected cost, not only of the carrier but all ships and equipment necessary to protect it in case of combat.

Secretary CHAFEE. Could I ask one question, Mr. Chairman?

Are you figuring that this would be an aircraft carrier that we would not otherwise have or are you figuring that if we didn't have this aircraft carrier we would somehow keep an older aircraft carrier? In other words, if we had an older one and kept it going to its 40th year, for instance, then the planes wouldn't be in addition and the escorts would not be in addition. You see, we now have 16 decks that we are now operating. Under this concept by 1981 we would only have 12 decks that would be economical to operate. If you are saying, counting this new aircraft carrier, a brand new one, that if we didn't have it we would only have 11, then your way of computing it is a fair one.

Chairman ELLENDER. I am trying to compute it as fairly as I can. What I am trying to bring out is the number of ships and people that will be needed to operate that one carrier and all of the other equipment by way of ships to protect it.

Secretary CHAFEE. I don't think you can ascribe four escort vessels to this aircraft carrier and say if we didn't have the carrier we wouldn't have those vessels.

Senator CASE. You need [deleted] if that is the question.

Secretary CHAFEE. I guess that is the question. Furthermore, if we didn't have the aircraft carrier, it doesn't mean we could then scrap four escort vessels.

Admiral ZUMWALT. We would need more escorts.

Chairman ELLENDER. You mean to escort the——

Admiral ZUMWALT. To escort the convoys.

IMPORTATION OF OIL AND STRATEGIC MATERIALS

Chairman ELLENDER. You figure as in World War II, I guess, that you are going to supply Western Europe?

Secretary CHAFEE. We will be supplied, too. We are going to have to import oil and strategic materials to some extent in any case. Just like in the middle of the last war we had tankers coming up from Venezuela.

Senator CASE. How does a convoy operate? Say it is to go from some place on the Persian Gulf to New York. What course does it take?

Admiral ZUMWALT. In wartime you would try to leave the route flexible and reroute it as we got intelligence about concentrations of submarines.

Senator CASE. What other kinds of traffic would be affected, too, and from where?

Admiral ZUMWALT. At the present time it would be exclusively a submarine threat after we had dealt with any aircraft that might be operating out of Cuba.

Senator CASE. That is the only place that aircraft could reach you from a hostile point?

Secretary CHAFEE. I think potentially they could reach us from [deleted] for instance. I am not saying they are there now.

Senator CASE. How would we handle these?

Secretary CHAFEE. Without an aircraft carrier, we would be in a difficult spot.

Admiral ZUMWALT. What we would have to do is route them out of the Persian Gulf if they survive because they would be subject to attack in the Persian Gulf and a wide end run out of bomber range from [deleted] then into the South Atlantic.

Chairman ELLENDER. What would it take on the first part of the trip?

Admiral ZUMWALT. Only aircraft carriers under the present concept, which is that we will not have bases anywhere in that area.

PROTECTION OF CARRIER FROM ATTACK

Chairman ELLENDER. The aircraft carriers would themselves be defensible in that situation?

Admiral ZUMWALT. Yes, sir. Aircraft carriers would be subject to attack and we have to do a lot of work to deal with the missile threat as well as the torpedo threat. But that is a long way away from the Soviet Union. We have a respectable opportunity if we keep the forces coming along.

MISSLE THREAT

Chairman ELLENDER. Now, the missile threat?

Admiral ZUMWALT. [Deleted.]

Senator CASE. How do you defend against those?

Admiral ZUMWALT. This Vulcan-Phalanx gun system I described is coming along very well. It looks as though it is the short-range answer at the target end. The F–14 aircraft gives our best opportunity to get the missile out at a significant distance from the task force or to get the aircraft, which may be carrying a missile. In the case of a submarine launched long-range missile, it would have to be a Phoenix missile. No other aircraft missile system I know of can deal with that submarine launched missile threat.

Senator CASE. Is it a fairly secure system?

Admiral ZUMWALT. Yes, sir, we believe that it is going to be a very good system. We just tested the first Phoenix missile against a low flying target. We have conducted over 40 tests but this was the first one down at low altitude. With a nonlethal warhead, it passed within

[deleted] feet well within the missiles lethal radius. The F–14 is absolutely vital to deal with this low flying antiship missile threat.

Senator CASE. Is it mach 2.5?

Admiral ZUMWALT. Mach [deleted].

F–15 AIRCRAFT AND SPARROW MISSILE

Senator CASE. What was it we heard the other day from the Air Force?

Admiral ZUMWALT. The F–15.

Senator CASE. Which was going to carry another missile.

Admiral ZUMWALT. The Sparrow.

Senator CASE. Is that in the same family?

Admiral ZUMWALT. The Phoenix missile is a much longer range missile.

Senator CASE. The Sparrow is [deleted] miles [deleted].

Admiral ZUMWALT. The Phoenix is about [deleted] nautical miles against a fighter target and has been successfully fired in testing to [deleted] nautical miles.

Senator CASE. Are these in competition?

Admiral ZUMWALT. No, sir.

F–14 AND F–15 AIRCRAFT DIFFERENTIATION

Senator CASE. Is one or the other duplicative?

Admiral ZUMWALT. The F–15 is designed more for the dogfight role. The F–14 will be better than the F–4 in the dogfight role, but its primary requirement is as an aircraft capable of defending the fleet and convoys in the air intercept role. It has the capability to track 24 aircraft simultaneously and launch and guide six missiles at six different targets simultaneously. The F–14 has a tremendous command and control and target-handling capability that make it possible to cope with a high density raid coming in.

The F–14 would initially engage the threat substantially reducing the number of incoming raids to be dealt with by the surface to air missiles from the surface ships. Ultimately, the remaining targets would be countered with the close in weapon system on the ships.

(CTR) CARRIER-INSTALLED MISSILES

Senator CASE. Are all of these carried on the carriers themselves?

Admiral ZUMWALT. The Vulcan, Phalanx and the basic point missile defense system will be carried on all high value ships, that is the carriers and the frigates. The surface to air missile is on only one or two of our carriers and primarily on the frigate and the DDG and DLG.

Senator CASE. Thank you very much.

EFFECT OF CONVENTIONAL MISSILE STRIKE ON CARRIERS

Senator YOUNG. Mr. Chairman, may I ask a question?

Chairman ELLENDER. Senator Young.

Senator YOUNG. I assume that one Russian missile with a nuclear

warhead would destroy any carrier. Would they have conventional missiles that could destroy a nuclear carrier if they hit it?

Admiral ZUMWALT. No, sir. Our studies indicate that it would take [deleted] hits to give a [deleted] percent probability of being out of action. In the event conventional anti-ship missiles penetrate the active close-in defense, the vital areas of the carrier are protected by armor equivalent to that provided against overhead bombs.

Senator YOUNG. That is a conventional missile?

Admiral ZUMWALT. Yes. We got a pretty good test of this in the *Enterprise* fire when the nine bombs exploded, the equivalent of [deleted] surface-to-surface missiles and the vessel could have been back in action in a matter of hours.

RUSSIAN STYX MISSILE

Senator YOUNG. The Russian's Styx missile has a great range.

Admiral ZUMWALT. That is one of their oldest missiles. It has an operational range of about [deleted] miles.

Senator YOUNG. How many of those do you think they carry?

Admiral ZUMWALT. I believe it would take [deleted] to give it a [deleted] percent probability to get it out of action. It would take many more than that to sink it. You remember in the case of the battleship *Bismarck* the British surrounded it and they had to pump bullets into it hour after hour, something like 24 hours, as I recall. Then I think they had to go in and fire a whole bunch of torpedoes besides.

Senator YOUNG. I also think it was the new compartmentalized battleship which we didn't have at the time.

Admiral ZUMWALT. Yes, sir. Our carriers have capitalized on that. We have heavily compartmentalized and heavily armored our new carriers as a result of our wartime experiences.

DEFENSE OF CARRIER AGAINST SUBMARINE AND ATOMIC MISSILES

Chairman ELLENDER. How vulnerable would this carrier be to missiles that come from submarines?

Admiral ZUMWALT. There, again, the missile is a threat whether it comes from the surface ship, the submarine or the air. We would need to try to deal with it in terms of the F–14 aircraft, the close-in Vulcan Phalanx and the Basic Point Missile Defense System.

Chairman ELLENDER. Suppose a strike were made directly on the ship by one of these atomic missiles. Do you believe you could survive?

Admiral ZUMWALT. No, sir. Any target in the world, land-based or sea-based, would go up if it were hit by a nuclear warhead. It is just harder to hit a carrier than a land-based target.

Chairman ELLENDER. I understand. One of those bombs properly placed would destroy the ship.

Admiral ZUMWALT. Yes, sir, and would run the risk of a nuclear escalation. So we think there is a very big probability that the Soviets would limit themselves to conventional weapons.

Chairman ELLENDER. I hope you are right.

If they are out to get us as you believe, they will use anything at their command to destroy us.

Admiral ZUMWALT. I believe they will use the weapons best calculated to help themselves.

PERSONNEL AND CONSTRUCTION COSTS OF CARRIER AND ESCORT SHIPS

Chairman ELLENDER. Before I yield to Senator Case, I would like to complete the questions I asked in regard to the entire complement in a carrier force. I would like to have for the record the total number of personnel involved, the total number of ships involved and the entire cost. In that I would like to have included the personnel, and costs of the frigates, submarines, tenders, aircraft and any other support required.

Admiral ZUMWALT. All right, sir.

May I make a point, Mr. Chairman, that you would have to consider this as a cost that would be charged against forces that you want to maintain overseas.

Chairman ELLENDER. You would not have to do that if you did not build the ship. I am talking about what can we expect if a ship is built.

Admiral ZUMWALT. My point is that if we suddenly decommissioned all of our carriers today we would have zero capability to control the seas, absolutely zero. There would be zero possibility of sending supplies to relieve our forces anywhere around the world, there would be zero prospect of bringing resources into this country against opposition.

Chairman ELLENDER. I understand that.

Admiral ZUMWALT. That has to be a charge, I feel, against any forces that one considers employed anywhere, not just against the carrier itself.

Chairman ELLENDER. I understand that. We will find some way, I presume, if we are attacked, to defend ourselves.

But as chairman of this committee, if the committee decides to go along with it, I will have to defend this, and I want all the facts that I can obtain.

Admiral ZUMWALT. I understand, Mr. Chairman.

Chairman ELLENDER. Somewhere in the record the statement was made that, if this carrier is constructed, it will require four frigates to protect it, and it will require a complement of 5,250 personnel. I would like to have you corroborate that and supply the information I requested for the record.

Admiral ZUMWALT. We will do that.

(The information follows:)

The estimated initial procurement costs of CVN–70, with outfitting and post-delivery costs and missile system ammunition; a typical 1980 multi-purpose air wing; six escorts; and a Fast Combat Support Ship (AOE) which carries oil, ammunition and jet fuel are:

	Millions
CVN–70	$951.0
Outfitting and post-delivery	16.0
Ammunition for missile system	0.7
Air Wing [1]	621.5
Escorts [2]	566.5
AOE	74.8
Total	2,230.5

[1] Flyaway cost.
[2] See following discussion.

The identification of investment and operating costs of destroyer types which might be assigned to CVN–70 for a particular mission is difficult because the numbers change with the threat, with the area of operations, with the current tactical situation, and with other pertinent parameters of the operations. In fact, carriers operate as members of task forces which have been assembled to perform an assigned mission. The composition of the force will undoubtedly change a number of times as ships join or are detached. The task force strength may be increased in a particular geographic locality. The force may combine with other forces to perform some aspect of the mission. It may divide and disperse as units perform their individual assignments.

Escorts are not procured in numbers which are rigidly proportional to the numbers of carriers. They have many jobs to do—many naval missions to perform. In fact, a reduction in members of carriers would increase the potential threat posed by Soviet air, surface, and submarine units, and a disproportionately large increase in numbers of escorts would be needed to provide some possibility of countering this threat.

Conceptually, it might be appropriate to imagine a carrier with six escorts at some phase in its assigned operations. At that instant, the investment and operating costs of the task force would include the following escort figures:

[In millions of dollars]

	Investment
1 DLGN 38 [1]	254.9
1 DLG 26 [2]	64.4
2 DDG [2]	66.2
2 DD 963 [1]	181.0
Total	566.5

[1] Program unit cost.
[2] Construction cost of ship.

It is important to note that these costs for escorts are not properly associated with CVN–70. The veteran carrier which CVN–70 will replace in 1980 will be accompanied, as necessary, by escorting destroyer types. When replaced by CVN–70, the older ship will transfer its need for escorts as well as its mission responsibilities. Further, aircraft are transferable to other Navy requirements. If the decision is made in 1980 for CVN–70 to replace CORAL SEA, for example, the change in the "investment" value of a typical task group would be:

[In millions of dollars]

	Investment
CORAL SEA [1]	0
Typical airwing	378.9
Destroyer types [2]	566.5
Total	945.4

[1] Initial investment depreciated to zero after 33 years of service.
[2] Same escorting ships listed above.

	Millions
CVN–70	$[illegible]
Airwing	[illegible]
Destroyer types	[illegible]
Total	[illegible]

For the investment indicated by this example calculation of the difference between a CORAL SEA task group and the new CVN–70 task group, we have a modern, revitalized force whose principal unit, the carrier, will be capable with all of the responsiveness of nuclear power, well into the 21st century.

The estimated annual direct operating costs (pay, fuel, support maintenance and alterations) for CVN–70, air wing, escorts and AOE are:

	Millions
CVN–70	$37.5
Air Wing	58.3
DLGN–38	6.6
DLG–26	5.0
2 DDG–2	8.4
2 DD–963	7.2
AOE	6.8
Total	129.8

The operating costs listed above include the pay and allowances of all personnel required to operate the carrier, air wing, escorts and AOE. The personnel required are:

CVN–70	2,824
Air Wing	2,506
DLGN–38	430
DLG–26	419
2 DDG–2	678
2 DD–963	550
AOE	577
Total	7,984

Several considerations should be noted in order to put these costs in their proper context.

First, while the initial investment in CVN–70 is large, it will be an effective part of our force for 30 years. Hence, the amortized annual cost of its construction is $32 million. During that time, it will reduce the need to construct and sustain many different bases, as it can be used in many different parts of the world as have our present ships. This amortized cost can be compared to the annual costs of building and furnishing a changing land-based structure.

Second, during its lifetime, it will be provided several different wings of aircraft, as will any of our land-based tactical air forces. It is not the cost of the base but rather the cost of buying, operating and maintaining aircraft that [illegible] principal cost in any tactical aircraft system, land-based or sea-based. The [illegible] is different in that it provides these wings with a mobile and flexible [illegible] period of several decades. In effect, it provides many bases.

[illegible]ipal mission of CVN–70 is to provide a degree of sea-control with- [illegible]orces can be deployed and supported. Over 90 percent of U.S. [illegible] into the foreseeable future, will be moved on the surface [illegible] here are in large part the cost we have to bear in [illegible]rces or other tactical air forces overseas.

[illegible]MMITMENTS AND POSSIBLE LOSS OF [illegible]S OF SEAS

ussion of the CVN?

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mmitted both to reducing
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Union conducting foreign
d bases suitable for pres-
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COST INCREASES RESULTING FROM INTERRUPTION OF ESTABLISHED PRODUCTION LINE

Senator CASE. You do not provide it this year, Mr. Secretary, but as I remember in your appearance before the Joint Senate-House Armed Services Subcommittee, you said if the $152 million requested for fiscal year 1971 was not provided, the specially established production line for the nuclear propulsion plant components would be disrupted and the special facilities and trained personnel devoted to civilian production.

My question is: Did that interruption of the production line, in fact, occur as predicted in 1970 when these funds were denied?

Secretary CHAFEE. Yes, sir. I think that is one of the reasons that the costs of this carrier are so much greater than the cost of the *Eisenhower*, CVAN–69.

Senator CASE. I think this is fairly important.

Secretary CHAFEE. Yes; I think it is important.

Senator CASE. One of the arguments we are given all the time is that teams will be destroyed, facilities will be broken down, and organizations dispersed.

Secretary CHAFEE. I think it is too strong to say the organization would disperse, but I think we can accurately say it is interrupted in that the people are diverted into industrial production. Let me get some specific material on that.

Senator CASE. I would like to have it in the record, Mr. Chairman.

I don't think we need to keep our production line in being. For instance, funds were denied in 1970, 1971 and 1972—3 years. It probably would have been unwise to keep the line going for 3 years if you were not going to build the ship.

Secretary CHAFEE. It was the 1971 budget in which we made the request and it was disapproved. The fiscal 1972 budget did not have such a request. Now, our fiscal year 1973 budget again makes the request.

Senator CASE. In April 1970, you spoke to the fiscal year 1971 budget. That is right, Mr. Secretary.

Secretary CHAFEE. Just 2 years ago.

Senator CASE. So that 2 years are involved here.

I would like very much to have something on this for the record. If this is just an argument that doesn't have much factual basis, I think we ought to know it and forget it.

Secretary CHAFEE. When I answer your question, I won't answer it in order to justify my position because this is an argument that we receive.

Senator CASE. I was not joking. This is a very serious question that comes up all the time. I am very familiar with some facilities that have been dismantled in New Jersey, as an example. Nobody seems to be unhappy about this except the people around Camden. You are not happy because that ship has gone down the drain?

Admiral ZUMWALT. No, sir; I am smiling because you are smiling.

(The information follows:)

The third ship of the *Nimitz* class, the CVN 70, would have been delivered in March 1977, based on the Navy request for advance procurement funds for long leadtime nuclear propulsion plant components in fiscal year 1970 with the balance funding in fiscal year 1971. Since advance procurement funds were not provided in fiscal years 1970, 1971, or 1972, the ship delivery schedule has been changed to September 1980—more than five years after the scheduled delivery of the *Dwight D. Eisenhower*. This schedule requires most of the major nuclear propulsion plant components to be available for installation in the ship in 1977. This schedule can be met only if advance procurement funds are made available to the Navy early in fiscal year 1973.

Since advance procurement funds were not provided in fiscal years 1970, 1971, or 1972, production gaps have occurred in several of the special *Nimitz* class nuclear component production lines which were established at great effort and cost. With the large backlog in civilian and other military orders in the heavy equipment industry, industrial organizations are not willing to make long range production commitments without firm orders; consequently, the price and delivery of major machinery components not covered by firm orders are subject to considerable uncertainty. Thus, the delay in delivery of CVN 70 has been greater than just a day's delay in delivery for each day's delay in order placement resulting from lack of advance procurement funds. Further, disruption in CVN nuclear component order placement has created added uncertainty on the part of Navy nuclear component vendors as to the validity of the Navy's plan for the CVN program. The industrial capacity in the United States for manufacturing naval nuclear propulsion equipment for major surface warships and submarines is a real concern if the long range goal of strengthening the Navy through construction of nuclear warships is to be accomplished.

When advance procurement funds are made available in fiscal year 1973 the Navy will have almost no leverage to get back into immediate production; this has had to be taken into account in preparing the current cost and schedule estimate for the CVN 70. The Navy has no leverage to require any contractor to maintain, or re-establish in a short time, groups of qualified experienced, technical and production personnel. These groups take a long time to assemble; and because of their skill and experience, they are quickly reassigned to commercial work whenever they are no longer required for Navy work. In some cases, manufacturers will have decided to no longer manufacture equipment of this design, and the equipment will have to be procured from other manufacturers.

Procurement of long lead material for the *Eisenhower* was started in June 1967. Even with fiscal year 1973 advance procurement funding, the Navy cannot initiate procurement for the CVN 70 until July 1972 at the earliest—over five years after start of procurement for the *Eisenhower*.

The nuclear propulsion plant components for the CVN 70 will be manufactured by about 50 major suppliers and almost 1,000 sub-tier contractors. Since most of the components for the *Eisenhower* will either have been delivered or be in the final stages of fabrication by the time the Navy is able to place orders for CVN 70 components with FY 73 funds, the Navy will not know for certain the degree to which manufacturers of *Eisenhower* components will commit the same facilities and personnel to production of CVN 70 components until bids are received.

Polaris/Poseidon System

Admiral Zumwalt. Our present Polaris/Poseidon system is excellent now and is highly capable for the near future against threats that we anticipate the U.S.S.R. is likely to develop. That is true today largely because we did not rest with the strategic offensive technology available at the beginning of the 1960's even though it was perfectly adequate then and appeared to be adequate for the near future.

[A classified slide was presented to the committee.]

Admiral Zumwalt. This slide demonstrates the flight, the capability in red and potential threat in yellow. We have had to continue to build in order to outpace the threat.

If we had stayed with the A–1, for example, by 1967 we would have had an appreciable threat against it.

The early series A–1 Polaris missile and the *George Washington* class submarine looked very good at that time against what could then be called the "near-future" threat. But, we continued to improve the system. Today's result is the Poseidon missile which provides improved warhead characteristics and extended SSBN operating areas. Concurrent submarine improvements have included reduction of detectible noise levels, better passive sonars, and improved navigational equipment.

This orderly, upgrading process has paid off and the logic for it remains valid today. If we were still operating the original missile in the earliest submarine, the near-future threats would now be formidable. It would be unwise to assume that the offensive technology of the late 1960's and early 1970's will unequivocally remain adequate against the potential 1980's threats.

The Soviets are building strategic missile submarines at a rapid pace. We are building none. They now have operational and under construction more sea-based strategic missiles and submarines than we do.

ULMS Development Program

We can stay ahead of enemy developments for countering SSBN's, but only if we continue to improve our technology as we have in the past. For the past year the Navy has been developing a program to do just that—the Underseas Long Range Missile System (ULMS).

The program for development of this strategic missile system is time-phased: a near-term ULMS missile, capable of deployment in the present FBM submarines, as well as the ULMS submarine in the late 1970's, and a follow-on higher performance missile, for deployment in a new ULMS submarine in the early 1980's. The near-term missile, which will be developed as a hedge against the emergence of a near-term threat to the current SSBN's, will have greater range and improved penetration capability. The larger, follow-on ULMS will exploit the advantages in performance and flexibility afforded by the significantly larger launch tubes envisioned for the ULMS submarines.

Development of the ULMS submarine will stress prelaunch survivability and system reliability through improved quieting, propulsion plant design, and defensive support systems. Combining a long-range missile system with installation of modular submarine equipment offers significant improvements in system availability by eliminating the need for transiting to alert patrol areas and reducing refit and overhaul requirements.

Development of the near-term ULMS–1 missile is proceeding on an urgent basis to protect an option to deploy it in Poseidon submarines as early as 1977. The ULMS submarine development program is being restructured to design and build the ULMS submarine with lead ship delivery in [deleted] 1977 and deployment with the ULMS–1 missile in [deleted] 1978.

3-Year Acceleration

The Secretary of Defense's decision to accelerate ULMS development to permit first deployment in 1978, a 3-year speedup, reflects

the technological facts discussed above. [Deleted.] I firmly believe that we need ULMS in order to assure, with a high degree of confidence, a continuing survivable strategic force, regardless of an enemy first strike. We are moving forward now at an accelerated pace [deleted].

We must continue orderly development of the ULMS to cope with future Soviet capabilities and provide eventual replacement for our Poseidon submarines.

ULMS Versus Poseidon

Chairman Ellender. Admiral, what benefits will we receive from ULMS that we do not have in the Poseidon?

Admiral Zumwalt. The ULMS missile, because of its greater range, will make it possible to increase the operating area in which our boats can hide out by 450 percent. The longer range missile, the ULMS–2, when we get it, with the boat, will make it possible to hide out in 14 times as much water.

In addition, the ULMS boat will be quieter, harder to detect [deleted] it also will be necessary as replacement——

Chairman Ellender. Replacement for what?

Admiral Zumwalt. Replacement for the Polaris/Poseidon hull, the earliest of which will be 20 years old by the time the first ULMS come along.

Chairman Ellender. We are in process of completing the Poseidon conversion program. I remember complaining about how fast we were proceeding with the Polaris. This was a new weapon and doubtless there would be changes made, but, regardless of that, we proceeded to build 41 Polaris submarines. Later on we had to make substantial conversions in order to carry the Poseidon missile.

Admiral Zumwalt. In my judgment that is what has given us the deterrence that will last us until about 1980. The ULMS beginning in 1977 in the case of the missile and [deleted] in 1978 in the case of the boat, is what will give us the capability to make that next jump against the 1980 threat.

Soviet Missile Buildup

Chairman Ellender. What are the threats that prompt you to advocate the ULMS?

Admiral Zumwalt. The threat is something that has to be looked at in two frames of reference. First, the Soviets are building so many missiles so fast, and——

Chairman Ellender. You mean land missiles?

Admiral Zumwalt. Both land based and sea based.

Chairman Ellender. Sea based in submarines?

Admiral Zumwalt. Yes, sir. They will have more Yankee submarines than we will have at sea by 1974.

Chairman Ellender. What is the picture now?

Admiral Zumwalt. At the present time they have slightly less at sea than we do but by 1973 they will have as many at sea as we have.

Poseidon Submarine Conversions

Chairman Ellender. Do you propose to continue with the Polaris-to-Poseidon conversion program?

Admiral ZUMWALT. We propose to continue the conversion.

Senator CASE. Thirty-one, isn't it?

Admiral ZUMWALT. Thirty-one out of 41 will be converted. The original boats are the Polaris boats. The first one will be 20 years old when the first ULMS comes along.

Chairman ELLENDER. How long will it require to make the ULMS operative?

Admiral ZUMWALT. The present IOC for the boat is 1978, sir.

Chairman ELLENDER. Would it have many advantages over the Poseidon submarine?

Admiral ZUMWALT. Yes, sir; quieter, harder to detect [deleted] and a much broader area in which to hide.

Chairman ELLENDER. How far had you progressed with the Poseidon when this new weapon concept came into being?

Admiral ZUMWALT. We are, of course, just asking for a relatively small amount of money for the new weapon, the ULMS, this year. We are already practically through funding the conversion of Poseidon's. We have in this year's budget the next to the last increment and next year we will finish that up. That is what gives us the deterrence against attack from now until 1978 and 1979 when the first ULMS begins to come along.

NECESSARY SHIP CONSTRUCTION AND INITIAL PLANS FOR ULMS

Chairman ELLENDER. Could you protect the United States by increasing the numbers of Poseidons?

Admiral ZUMWALT. We would have to replace the boats at some time. We believe that for a submarine, 20 years is beginning to be getting fairly old. You might be able to get by with 25, but there is a lot of risk operating down at the deep depths that the submarines operate. We would be reluctant to see them go very much beyond 20. So that the ULMS has always been in our mind as something that we would have to have to replace the present hull.

Chairman ELLENDER. When did that become apparent?

Admiral ZUMWALT. Our plan had been to have it become available in [deleted.]

Chairman ELLENDER. When was that concept developed?

Admiral ZUMWALT. The day we first began to build the Polaris boat, sir, we had in mind that some day it would have to be replaced.

ULMS STATUS AND POTENTIAL

Senator CASE. Is it just a set of dreams based on desired specifications or is it a collection of blueprints or something concrete?

Admiral ZUMWALT. At the present time, it consists of a stack of papers at least this high [indicating] literally hundreds of tradeoff analyses as to what is the right combination of speed, depth, missile numbers, missile range, to get the greatest amount of potential target coverage. We have pretty well settled in on what we think the final configuration will be.

Senator CASE. I don't know what that will be. How much better would it be than your present submarines?

Admiral ZUMWALT. It will be much better than the Polaris/Poseidon because it will be quieter and it will be able to hide out in four and a half to 14 times as much area, depending on whether it is first- or second-generation missile.

Senator CASE. You mean it has more range?

Admiral ZUMWALT. Yes, sir.

Senator CASE. Away from the home base?

Admiral ZUMWALT. Yes, sir.

Chairman ELLENDER. Isn't that the virtue of it, that it will be home-based instead of being based abroad?

Admiral ZUMWALT. Yes, sir. It will not have to be based in Rota or Holy Loch. It can be based in continental United States because it will be in range of its targets as soon as it gets to sea.

CHARACTERISTICS OF ULMS

Chairman ELLENDER. How does the size of this submarine compare with your Poseidon?

Admiral ZUMWALT. It will be larger, sir.

Do we have the characteristics there?

It will have a [deleted].

Chairman ELLENDER. You say [deleted] feet in diameter. What length will it have?

Admiral ZUMWALT. I will have to provide that for the record.

(The information follows:)

The baseline ship is a single hulled ship, [deleted] feet in diameter and about [deleted] feet long carrying 24 missiles.

Secretary CHAFEE. It is about [deleted] feet. Presently our submarines have a missile that can go 2,500 miles. These submarines were built starting in the late 1950's with the last one being built in the mid-1960's. So that the mid-1980's, the last one will have reached the age of 20.

ULMS–1

Now, the idea is to come ahead with this new class of submarines. First, develop the ULMS–1, which is the missile. That missile will give us a range of about [deleted] miles and will fit into the present submarine, that is into a Poseidon missile tube.

ULMS–2

Later we plan to also build an ULMS–2, a much longer range missile [deleted] miles. We are working on the submarine which is an expensive submarine. As international conditions seem to warrant, the rate we have projected here will deliver that submarine by 1978.

Now, that is about a 2- to 3-year speedup from the original plan we had when we came here last year.

EXPENDITURES TO DATE

Chairman ELLENDER. How much have you spent to date in the program?

Secretary CHAFEE. We have spent about $60 million in fiscal year 1971 and prior years.

Chairman ELLENDER. What have you done with that $60 million?

Mr. SANDERS. The fiscal year 1972 amount authorized is about $105 million.

Secretary CHAFEE. They have been designing both the missile system, which includes ULMS–1——

Chairman ELLENDER. They have done only paperwork on it?

Secretary CHAFEE. Yes. They have not built anything. They have all kinds of designs. They may well have not spent the entire amount of money. But they have had these designs and they have done similar designs working in cooperation with industry on the submarine.

SUBMARINE LAUNCHING DATE

Chairman ELLENDER. When do you propose to construct the first ULMS submarine?

Secretary CHAFEE. If we get the approval from Congress we would plunge ahead with our design and I suppose the first metal will be cut on the submarine about [deleted]. The submarine will be launched in [deleted] and will join the fleet in 1978.

MISSILE PRODUCTION DATE

Senator CASE. How soon will the ULMS–1 missile be developed?

Secretary CHAFEE. That will be ready just 1 year before the submarine.

Admiral ZUMWALT. We must have the submarine to replace our existing submarines. The only question there is the rate.

SEA-BASED MISSILES VERSUS LAND-BASED MISSILES

Chairman ELLENDER. Instead of constructing a submarine with [deleted] wouldn't it be better to use land missiles instead?

Admiral ZUMWALT. No, sir. We were talking about threat. The great virtue of the sea-based missile system is that they will not be able to do that.

Senator CASE. You are not advocating stopping work on the ABM?

Admiral ZUMWALT. I do feel, sir, that we must try to go forward with the ABM program because it does give us some protection from those missiles in the area of coverage. I also advocate that we keep some land-based missiles and bombers as well as sea-based missiles because one is never sure where the next technological breakthrough will come.

SYSTEM TOTAL COST

Chairman ELLENDER. I wanted to get an approximate cost of this system if Congress should decide to give you the funds you are asking for, because that question is going to be asked and I want to be able to answer it, if I can.

You say $105 million has already been provided for that program. Do you include the $35 million that you are asking for in the supplemental?

Admiral ZUMWALT. That would be additional.

Chairman ELLENDER. So that would be how much?

Admiral ZUMWALT. We asked for $62.2 million in 1971 and prior years and $104.8 million in 1972. In addition to that, we have asked for $35 million in the supplemental.

Chairman ELLENDER. How much are you asking this year?

Secretary CHAFEE. All told, $945 million.

Chairman ELLENDER. Why such a large amount?

Admiral ZUMWALT. $361 million of that is for long leadtime procurement items; $520 million of it is for R.D.T. & E.; $27 million is for military construction associated with the basing, testing, and so forth; $23 million is for operation.

Chairman ELLENDER. That will be almost a billion dollars.

Secretary CHAFEE. Just about a billion dollars.

Chairman ELLENDER. At the point where it becomes operational, how much will it cost?

Admiral ZUMWALT. The total cost of the program in escalated dollars is about [deleted] billion for development and acquisition of [deleted] submarines with ULMS–1 missiles. That includes also the base complex, plus operational and maintenance costs through [deleted].

Chairman ELLENDER. How much larger missile will you have in this [deleted] mile range submarine?

Admiral ZUMWALT. All of them are [deleted].

Chairman ELLENDER. You expect to build——

Admiral ZUMWALT. The present plan calls for [deleted], sir.

Chairman ELLENDER. That is for the [deleted] submarines and all the missiles?

Admiral ZUMWALT. That is right.

Senator YOUNG. You have the inflation formula included in your estimate?

Admiral ZUMWALT. Yes, sir; that includes our estimate of the cost of inflation of labor and material.

MISSILES PER SUBMARINE

Senator YOUNG. How many missiles do you propose to have for these submarines?

Admiral ZUMWALT. Twenty-four.

LAUNCHERS AND WARHEADS PER SUBMARINE

Senator CASE. The launchers and the warheads would be [deleted] times that.

Secretary CHAFEE. The 10 ships would carry [deleted] launchers with up to [deleted] reentry vehicles per launcher.

MISSILE MEGATONNAGE

Senator CASE. Expressed in megatonnage.

Admiral ZUMWALT. [Deleted.]

Chairman ELLENDER. How much more powerful will those warheads be than what you are now using in the Poseidon?

Admiral ZUMWALT. [Deleted.]

Senator CASE. Each individual missile or weapon would be [deleted.]

Admiral ZUMWALT. That is right.

Now, that is our present plan. The final decision on the yield is one that I am sure will be made at the national level. This is just the Navy plan at the present time.

Home Basing and Greater Survivability

Chairman Ellender. The chief virtues in this new weapon are that it is homebased and the missiles will have a greater range.

Admiral Zumwalt. And it is much more survivable. It can hide out in four and a half times as much water.

Senator Case. What do you mean?

Admiral Zumwalt. At the present time, because the range of the Poseidon missiles is only 2,500 miles, it is restricted to operating areas fairly close into the Eurasian Continent. When you get the [deleted] mile missile, the submarines can go further to sea and hide out in four and a half times as much water. When you get the second generation missiles you can hide out in 14 times as much water.

Chairman Ellender. As long as it is at sea.

Admiral Zumwalt. Yes, sir; away from the land mass of the target area. So, it increases by a tremendous amount the problem a potential enemy would have in localizing strike units.

Poseidon Contractors

Senator Young. Where are the Poseidon conversions being done? Are they in Navy shipyards or private shipyards?

Admiral Zumwalt. About two-thirds are done in the private shipyards, sir, and one-third in public yards.

Senator Young. Who is making the Poseidon missile?

Admiral Zumwalt. Lockheed, sir.

Senator Young. Who is involved with the ULMS?

ULMS Research and Development

Secretary Chafee. We have not chosen anybody.

Senator Young. Is there any private industry doing research and development or is that all Government conducted?

Admiral Zumwalt. That is primarily in-house. There is no significant research other than by Lockheed, on the outside up to this point.

Secretary Chafee. Private companies have worked on the preliminary design of the submarine.

Admiral Zumwalt. The reactor is being developed primarily by General Electric. The detailed boat design will be done by a private contractor.

Advantages of ULMS Over Poseidon

Secretary Chafee. There are other points in the advantages you listed; the missile range and the resultant increase in vulnerability, and more missiles per boat.

Chairman Ellender. I understand, but you will have only [deleted] whereas you will have 31 Poseidon submarines.

Secretary Chafee. Yes, but we can still have those Poseidons.

Chairman Ellender. I know you can have them; you can build many more.

RUSSIAN SUBMARINES

I wonder if all of this is necessary.

Admiral ZUMWALT. The Soviets are constructing their [deleted] *Yankee* submarine. They are building at the rate of eight or nine per year. They have just doubled the——

Chairman ELLENDER. Undoubtedly they will start to develop this one, too.

Admiral ZUMWALT. They already have it, sir. They have just [deleted]. They are ahead of us in this field, sir.

Chairman ELLENDER. That is why you are doing it.

Admiral ZUMWALT. We are doing it, Mr. Chairman, to retain our capability to so damage the enemy in a second strike that he will not strike first. We are doing it in the face of a massive increase of capability on his part that makes it moot as whether or not we can retain that capability without the system.

POSSIBLE SELECTION BETWEEN ABM AND ULMS

Senator YOUNG. Mr. Secretary, is not the major purpose of the ABM to provide enough survival capability of our Minuteman in case of attack so that we could counterattack? Maybe I have not phrased it correctly, but is this supposed to help us have enough survival for our missiles so that even though we were struck with everything they had, we would have a capability of striking back?

Secretary CHAFEE. That is right.

Senator YOUNG. If you had an ULMS system, would that not in a large measure take the place of the ABM? We would not need them both.

It seems to me you could hide these ULMS submarines, so that they could not be destroyed. You would have that second strike capability.

Secretary CHAFEE. That is right. Of course, everybody is reluctant to put all their eggs in one basket. This is pretty serious business. If the country decided not to bet everything on undersea deterrent, who knows, they might come up with some detection device for under the water that could locate these.

Senator YOUNG. It seems to me if I could have the choice and if we could have only one system, I think the ULMS would be better than ABM for second strike capability.

Senator CASE. The Defense Department sees this essentially from one point of view. It is your job to do it. This is not criticism.

Senator YOUNG. It is their job to foresee future requirements.

Senator CASE. Maybe some of you would like to have elected office. Admiral, would you want to try?

Admiral ZUMWALT. No, sir; I would not want to trade places.

Senator CASE. I will not go any further.

EXPENDITURES, LESS INFLATION COSTS, OF LEVEL OF 1964

Admiral ZUMWALT. This might be an appropriate time to make the point with regard to your concern, Mr. Chairman. While defense spending rises $25.7 billion from fiscal year 1964 to fiscal year 1973, other Federal spending rises by $107.7 billion at the same time. Then

as you saw from Mr. Chafee's chart, if you convert that increased money to purchasing power, taking out inflation, we are actually spending about the same amount that we spent in 1964.

Chairman ELLENDER. What I am worried about is the condition of our total Federal budget now. Just the interest charge per year by the end of the next fiscal year 1973 will be close to $25 billion a year.

Admiral ZUMWALT. The one department of this Government which is showing a decrease in purchasing power is the Department of Defense, sir.

THREE-YEAR DEFENSE COST INCREASE

Chairman ELLENDER. It depends on what concept is employed, doesn't it? The budget shows that total obligational authority provided the Department of Defense in fiscal year 1971 was a little over $71 billion. In 1972 it rose to $75 billion. For fiscal year 1973 the estimate is almost $82 billion. I recognize that in constant dollars the relative amounts would be somewhat different, because of the effects of inflation. However, the fact remains that between 1971 and 1973, based on present estimates, the cost of defense will climb almost 15 percent.

PATROL FRIGATE PROGRAM

Admiral ZUMWALT. Shall I move on to the patrol frigate?

(A slide was presented to the committee.)

AUGMENTATION OF INADEQUATE ESCORT FORCES

Admiral ZUMWALT. The patrol frigate program is a continuation of our effort to augment our inadequate escort forces and to replace World War II vintage destroyers which no longer have the weapons, sensors or growth potential for further modernization. PF's will fulfill an important mission in both the Atlantic and Pacific Oceans. Among other assignments, their most vital one will be to help keep open the sea lanes for transport of critical resources into the United States. Our request for $191.5 million provides funds for ship system design and procurement of the lead ship. Contract award for the lead ship is expected early in fiscal year 1973. We envisage a 50-ship program allocated among at least three contractors. We have exercised rigid configuration control to optimize the ship for its mission while keeping the costs low enough to permit acquisition in the numbers required. We have consciously eliminated shore bombardment and ASW escort for fast carrier strike forces from its mission in order to keep the price down.

SEA CONTROL SHIP (SCS)

Admiral ZUMWALT. The SCS will be a relatively small, austere ship whose principal mission will be to protect: (1) merchant ships bringing critical resources to the United States, (2) underway replenishment groups, (3) amphibious assault forces, and (4) tasks groups that have no aircraft carriers in company. Its task will include antisubmarine and antiair warfare, defense against antiship missiles, early warning, and surface attack. The program is now in concept formulation; preliminary design has begun. As we now see it, the SCS will

displace about 15,000 tons and carry about 17 aircraft, including helicopters and vertical or short takeoff and landing type aircraft.

Senator CASE. This is the kind of thing I was thinking about when I was talking about smaller aircraft carriers.

Admiral ZUMWALT. This ship will give us the capability to give some protection to the sea lines in the middle of the ocean and down in the South Atlantic and Indian Ocean areas. We could never bring it close to a high density air or missile area threat because it doesn't have the necessary self-defense features, the compartmentation and damage control, or the redundancy.

ACCOMPANYING SHIPS

Senator CASE. Would these have screens?

Admiral ZUMWALT. Yes, sir. They would probably normally operate with a convoy and there would be some escort ships present.

Chairman ELLENDER. As I understand, the Russians have one or two ships of this general type.

Admiral ZUMWALT. They have two, the *Moscow* and *Leningrad*. They are actually much bigger ships than the SCS, however. They are about 20,000 tons.

Chairman ELLENDER. Will this accompany a convoy?

TRANSPORTATION OF CRITICAL SUPPLIES

Admiral ZUMWALT. Yes, sir; it will be responsible for helping us bring in the critical supplies to this country, for convoying underway replenishment ships, amphibious task forces or other forces that didn't have carriers.

Chairman ELLENDER. It would be used to protect ships carrying oil or other commodities to us so that we can keep our industries running. Is that the idea?

Admiral ZUMWALT. Yes; that plus the patrol frigate plus the aircraft carrier to deal with the heavy air threat and the heavy submarine threat will give us an increasing probability of success against the Soviet in the out years when we get them. It will help bring us back up above the line I have been talking about.

FIRST GENERATION AND FOLLOW-ON SHIPS COSTS

We plan for a "buy" of 8 SCS ships in the first generation of this new type. Follow-on ships are expected to cost less than a hundred million dollars each in current dollars.

SCN funding of $10 million in the fiscal year 1973 budget is for contract design, with full funding of the first ships planned for fiscal year 1974. An initial operational capability of fiscal year 1978 is planned.

F-14/PHOENIX

The F-14 weapons system continues to have one of the highest priorities in the Navy. Continued development and introduction into the fleet are vital to the Navy's ability to maintain control of the seas in the years to come. Armed with the Phoenix missile, the F-14 is the only fighter flying, or on the drawing board, capable of dealing with the Soviet Foxbat at maximum altitude.

COMPARISON OF F–15/SPARROW SYSTEM

Senator CASE. What about the F–15 and the Sparrow?

Admiral ZUMWALT. To the best of my knowledge and belief, sir, the only way that any aircraft carrying a Sparrow missile can get the Foxbat at altitude is by performing a snap-up maneuver. The Sparrow launch zone against a very high altitude, high speed Foxbat is minimal. The instant in time at which a missile must be launched is so brief, a matter of seconds, that the intercept maneuvers must be precisely performed. Whereas, in the case of this Phoenix missile, because of its very long-range and high altitude capability, aircraft maneuvering is not required. The F–14 can fire, after tracking the target, at the right time and it has a much longer window of time, approximately [deleted] in the missile launch zone. Missile range and time in the launch zone are the critical factors in a high altitude engagement.

Senator CASE. Are you working together with the Air Force in the development of these two missiles? You started this development.

Admiral ZUMWALT. Yes, sir; the Sparrow was also a Navy developed missile. We are keeping in close touch in regard to the two aircraft. The engine is going to have a lot of features in common when we get to the F–14B engine.

F–14 AIRCRAFT CARRIAGE OF SPARROW AND SIDEWINDER MISSILES

Secretary CHAFEE. The F–14 will carry the Sparrow, too.

Admiral ZUMWALT. Yes, sir; as well as the Sidewinder. The F–14 will provide a significant margin of superiority against high-performance air and missile raids against our carrier task forces.

AIRCRAFT PERFORMANCE AND TESTING

Critics predicted that the F–14 performance would not be achieved; however, all testing to date indicates otherwise. The cause of the unfortunate loss of the first F–14 in December 1970 was identified and corrected. Flight tests were resumed in May. Documented data have confirmed that the aircraft is meeting and, in some cases, exceeding specifications.

Six pilots from the Naval Air Test Center completed the first Navy preliminary evaluation (NPE) in December. Although the final results are not yet published, initial reports indicate that the NPE team's impressions concerning overall airframe performance and availability were unanimously favorable. In 13 flying days, the NPE team, flying two aircraft, made 39 flights for a total of 73.9 hours, with only minor maintenance required. The aircraft showed outstanding handling qualities, and its flight characteristics and approach speed in the carrier landing regime make up optimistic that it will repeat the outstanding qualities of the A6 in this important performance requirement.

Today, a total of nine F–14A aircraft are involved in an extremely successful test program. Aircraft No. 1X, replacing F–14 No. 1 as the high-speed test vehicle, has swept its wings through the full range and has flown faster than Mach 2.0 at 42,500 feet. Aircraft No. 2, the slow-speed test airplane, has flown as slow as 95 knots at 23,000 feet. The

first aircraft with a complete radar weapons system installed (No. 4) flew in December, and three more (No. 5, No. 6, and No. 9) will be flying in the next few months.

PHOENIX MISSILE FIRINGS

The next Phoenix missile firings will be conducted this month from the TA–3B test bed, which has installed a developmental version of the F–14's AW–9 radar weapons control system. Initial F–14 Phoenix firings are planned for some time within the next few months. Phoenix firings to date have achieved a 73-percent success rate against realistic targets.

PRIOR FUNDING BUDGET REQUEST AND DELIVERY SCHEDULE

To date, 12 research and development aircraft, plus the first 74 production aircraft for Readiness Squadron and initial fleet squadron outfitting, have been funded. The present budget is for an additional 48 F–14A aircraft to continue an orderly program of modernization. Some adjustment in the delivery schedule may be necessary as a result of the cumulative schedule impact that has accrued from the crash of the first aircraft a year ago. This adjustment in the delivery schedule will also give us more time to review the development and phase-in of the B engine. That engine now appears to be progressing quite well after experiencing development problems last year.

We are just completing a review of the program and will advise the Congress of our plans as soon as they have been completed.

AIRCRAFT CONTRACT COST: FUNDING AVAILABILITY AND GOVERNMENT OPTIONS

Chairman ELLENDER. Admiral Zumwalt, do you think the contractor will produce these 48 F–14's in accordance with the existing contracts?

Admiral ZUMWALT. I think there is some appreciable doubt as to whether or not the contractor will be able to perform in lot V and subsequent lots for the money at the present numbers. Our position, as Mr. Chafee testified earlier, is that we must at this time go forward with the assumption that the company will perform. You will recall last year the contractor indicated that they would not be able to perform. We did get the assurance that the money would be appropriated and then Grumman, the contractor, went ahead and agreed to perform on lot IV. With regard to lot V, which is in this year's budget, we feel we should again request the money and therefore retain our favorable contracting position but not have breaking the contract ourselves by failing to get the money.

It is our current intention to proceed within the framework of the existing contract. Of course, the committee realizes that the crash of No. 1 aircraft has resulted in delaying lots I through IV. The financial and schedule consequences have been made the subject of a request for contract adjustment by Grumman and are now being examined by the Navy. Accordingly, the Navy will not release the long lead funds for lot V on April 1. In the event a contractual dispute arises, the Congress will be kept informed of the Navy's actions in a timely manner.

Chairman ELLENDER. Proceed.

SURFACE EFFECT SHIP (SES)

(A slide was presented to the committee.)

Admiral ZUMWALT. A technological breakthrough that offers the potential for revolutionizing naval warfare is the surface effect ship. The SES, riding on a cushion of air at more than 80 knots, promises to improve our capabilities for surface ship missions. The advent of these very high speed ships will change warfare at sea in ways we cannot yet fully foresee.

PROTOTYPE TESTING

Two 100-ton test craft will begin underway evaluation this spring. Our next goal is to produce two prototype ships, of 2,200 tons each, the smallest ships of their type likely to have military value in the deep ocean. We need the prototypes as fast as technical progress and funding constraints will permit. The fiscal year 1973 funds we request will enable us to award a detailed design and construction contract for large prototypes later in the fiscal year. We now expect, with your support, to have the two 2,200-ton prototype ships ready for evaluation by the end of fiscal year [deleted].

Chairman ELLENDER. If you recall, this committee refused to provide funds last year until the 100-ton ships you had under construction were evaluated. I do not believe that the committee has changed its mind.

Admiral ZUMWALT. This year, as I have said, this spring, we will start tests of those two. In fact, the Bell craft had its first run 2 days ago.

Chairman ELLENDER. I thought it was last fall, when we were down there together.

Admiral ZUMWALT. You remember that when we were down there they didn't have the gear train and it took longer than they estimated to get it. The schedule is tight. We believe that there is a reasonable prospect that we will have enough data from testing of these two 100-tonners to permit us to go ahead with the preliminary design of the 2,200-tonner. We believe the potential for changing the whole nature of warfare at sea is so great, it is like nuclear propulsion, we ought to go forward recognizing that we can't commit this money until we get the test data but we believe we can do it within the fiscal year about which we are talking.

GUIDED MISSILE HYDROFOIL PATROL CRAFT (PHM)

(A slide was presented to the committee.)

Admiral ZUMWALT. The PHM, which is a cooperative NATO program, will provide a high mobility capability for delivering antiship cruise missiles in narrow waters at relatively low cost. Our development has progressed to the point where we can request two of these craft in this year's program. An IOC of [deleted] is planned.

Chairman ELLENDER. You say that is a cooperative effort with NATO?

Admiral ZUMWALT. Yes, sir. We are in the process right now of negotiating with several NATO countries. Some of them will actually put money in to help us build in this country the first prototype and

then we will agree on fairly common design and each country that has bought in it will have the right to produce it.

CONVENTIONAL FORCES NECESSARY FOR MANAGING LIKELY CONTINGENCIES

Mr. Chairman, the strategy enunciated by the Secretary of Defense makes it clear that strong and capable naval forces are an essential element of the conventional forces which will be necessary for managing the likely contingencies of the next decade. In some contingencies, because of geographical, political, or other constraints, they may be the only forces which have utility.

The Soviet naval building program which I have discussed gives unmistakable evidence that the U.S.S.R. recognizes the value of naval forces and that they intend to attain predominance at sea. Our own initiatives—particularly those in the area of sea control—are directed toward denying them this capability and to this end we are making the best use of the dollars allotted to us. But, as I have pointed out, neither change or improvement comes fast. Despite the decision to try to modernize, it takes a substantial part of our budget to maintain some of our capability today. Long leadtimes in construction also delay the arrival of improvements.

Our force reductions have thus far not been compensated fully by our efforts at improvement through new initiatives. The Secretary of Defense has stated that last year he presented a "bare bones" budget, in effect one providing for base line forces from which we should build. Congressional action further reduced that base level by $3 billion. The Navy budget which we recommend this year, is a first step in building from that reduced base line.

FUNDING THE FUTURE

Admiral ZUMWALT. As I stated earlier, our fiscal year 1973 budget puts an increased proportion of our resources into the future. Our FBM forces are fully supported and their modernization assured if we get the money. But in other areas of our current capabilities—sea control, projection, and overseas presence—we accept substantially increased risks. [Deleted.] This is necessary, however, if we are to build toward the naval capabilities that will be required in the late 1970's and early 1980's.

We are in a period in our history in which we face grave risks from circumstances over which we may have little control. Our Navy can be a decisive factor in such circumstances. As an island nation, we cannot rationally engage in commerce, honor treaties, or deploy forces overseas without the protection of a strong Navy. Without adequate naval capability we cannot deter conventional war, let alone win it.

Therefore, Mr. Chairman, I recommend approval of the full amount of the fiscal year 1973 Navy budget as a matter of grave national urgency. Approval by the Congress will allow us to move forward toward the attainment of the types and amounts of naval power that will enable us to fulfill the role required of our Navy under the strategic doctrine laid down by our President and Secretary of Defense.

Chairman ELLENDER. Are there any further questions?

Thank you.

QUESTIONS BY SENATOR THURMOND

Chairman ELLENDER. Senator Thurmond has some questions for you, Admiral. The questions and answers will appear at this point in the record.

(The information follows:)

OBLIGATION OF F–14 FUNDS

Senator THURMOND. Admiral, at the Armed Services Committee hearing yesterday, it was stated the Navy lawyers concluded the Navy did not have to obligate the F–14 funds on April 1. Has the DOD General Counsel confirmed this decision?

Admiral ZUMWALT. Yes.

Senator THURMOND. If the Navy is wrong and the contractor is eventually proven correct on the April 1 deadline, it would cost the Government some extra money. Do you agree?

Admiral ZUMWALT. The contract provides that Grumman is only entitled to any costs which they can prove lack of long lead funding on 1 April would cause Grumman to incur. Since there is a present slip in the delivery schedule of six months, it was the conclusion of the Navy that the long lead funds were not required on 1 April and that there is a minor impact on contract price for Lot V.

PROTECTION OF GOVERNMENT INTEREST

Senator THURMOND. Admiral Zumwalt, in the C–5 contract the Air Force lawyers made some bad decisions and it eventually cost the Government some money. Would you take any extra efforts necessary to assure that no action by April 1 will not put the Navy in an unfavorable position?

Admiral ZUMWALT. I am assured that all efforts that are needed and necessary to protect the Government's interests have been taken and are being taken.

PHOENIX MISSILES

Senator THURMOND. Admiral, how many Phoenix missiles will each F–14 carry?

Admiral ZUMWALT. A maximum of six.

Senator THURMOND. Is the cost of these missiles a part of the F–14 program unit cost shown in the data sheet?

Admiral ZUMWALT. No.

Senator THURMOND. How much does each missile cost?

Admiral ZUMWALT. The flyaway unit cost for the missile is [deleted]. The PHOENIX procurement unit cost is [deleted] including support and spares. The total program unit cost to complete in FY 1974 and subsequent is [deleted].

UNIT COST OF S–3A

Senator THURMOND. Admiral Zumwalt, the S–3A is a $3.1 billion program. Why is the unit cost of this plane over $15 million?

Admiral ZUMWALT. The S–3A is a highly sophisticated ASW aircraft. It contains the most advanced avionics systems available today to enable the four man crew of this small, carrier-based aircraft to accomplish the ASW task at the same level of effectiveness as the P–3C's twelve man crew. The $15 million figure actually includes all development costs, support equipment, and spare parts from program inception averaged over the 199 aircraft buy. However, the average "unit cost to completion" for the remaining 191 aircraft is only $12.7 million.

S–3A SCHEDULE

Senator THURMOND. Why will fleet introduction of the S–3A in February 1974 come so long after the first flight last month?

Admiral ZUMWALT. The S–3A program is proceeding systematically and deliberately toward Fleet introduction. Although the first development aircraft flew in January, a fully equipped aircraft will not fly until July. During the year which will follow, the aircraft will undergo an extensive test and integration program designed to ensure that the aircraft is capable of doing its job properly. This contractor effort is followed by the Navy Board of Inspection and Survey Trials in October 1973 which will validate the performance of production aircraft. Fleet introduction will commence after completion of the initial phase of those trials.

S–3A Technical Problems

Senator Thurmond. What are the chief technical problems which remain in the S–3A program?

Admiral Zumwalt. There are no major technical problems in the S–3A development program. Minor aircraft and engine interface problems exist; however, the changes required have been defined and no impact on the production schedule is forecast.

Equipment for S–3A

Senator Thurmond. Admiral, do the first S–3A's given to the Navy have all the equipment this aircraft is supposed to carry?

Admiral Zumwalt. The first two development aircraft delivered will be dedicated to the flying qualities and performance testing program; therefore, they will not be equipped with ASW systems. Aircraft number three will be delivered in May with a complete set of equipment; and, as I mentioned before, it will start flying in July.

S–3A Technology

Senator Thurmond. What new technology is present in the S–3A which gives it such an advantage over our present aircraft?

Admiral Zumwalt. The S–3A will have an acoustic detection and analysis system which is more sensitive and has more capability than any other system in existence today. It will also have an improved electronic countermeasures system, a more capable magnetic anomoly detection system and a new forward looking infrared system for night classification. The S–3's radar is the first developed specifically for ASW operations. Operation of all of these sophisticated equipments is aided by a high capacity digital computer, providing the most potent ASW vehicle ever developed.

U.S. Marine Corps

STATEMENT OF GEN. ROBERT E. CUSHMAN, JR., COMMANDANT OF THE MARINE CORPS

PREPARED STATEMENT

Chairman Ellender. General Cushman, we have kept you for dessert.

We have heard considerable testimony from the Marine Corps already. In view of that, I would suggest that you place your whole statement in the record and that you highlight it.

General Cushman. I will be glad to. We have submitted, as the Chairman mentioned, a 21-page report. I have a short statement which does summarize the salient points.

(The statement follows:)

Mr. Chairman, members of the Committee, I am pleased to have this opportunity to present my first report on the posture of the Marine Corps. At the outset of my stewardship, I am firmly convinced that this remarkable military organization is one of America's soundest security investments, and I am confident it will remain so—both in terms of its inherent quality and its potential returns.

Fire can have a tempering, as well as a destructive effect. The Marine Corps has emerged from the crucible of Vietnam tougher and more resilient than ever, despite combat losses. Our standards are untarnished, and we are prepared to resume our role as this Nation's amphibious ready force of combined arms.

Before I begin detailed discussion of the Marine Corps itself, I would like to touch upon our role in supporting National policies, from the standpoints of both our amphibious capability and our readiness to respond to crisis—anywhere, anytime.

Under the Nixon Doctrine and its supporting National Security Strategy of Realistic Deterrence, a requirement exists to provide the President a range of capabilities that will permit the selective application of force to deter armed conflict or to stabilize crises early in their development.

Navy-Marine Corps amphibious task forces, strategically located in international waters, can provide a credible peacetime deterrent by maintaining continuous presence in critical areas, without risking automatic involvement when crises develop. Combat power can remain afloat, as either a demonstration of U.S. concern or a show of force, depending upon the circumstances. It can be projected ashore, with a precision consistent with tactical and political aims, and, significantly, the combat power of amphibious forces can be disengaged and re-embarked on order, in low and mid-intensity conflict situations. Thus, positive control is provided for the level and duration of U.S. military involvement.

As our military presence overseas continues to diminish, the possibility of unopposed reinforcement becomes more and more remote. In considering the alternative of forcible entry, we must regard our amphibious forces as uniquely capable of initiating and sustaining operations independent of fixed supply lines and local overseas facilities.

Since amphibious forces can establish U.S. presence without U.S. commitment, they can provide a peaceful means of supporting diplomatic undertakings. If we desire, we can mask our intent from potential opponents, while our options for action remain open.

After four decades of primary involvement in the development of amphibious doctrine, we Marines appreciate the subtleties of amphibious power. And we

continually seek new refinement, both in concepts and techniques. Seabasing, with its associated Seaborne Mobile Logistic System, is such a refinement currently under study by the Navy and Marine Corps. Its aim is to minimize landing force dependence upon command-and-control and support facilities based ashore. This will further enhance control of the level and duration of amphibious force involvement in crisis situations, and minimize the need for offensive combat power to be fragmented to defend shore facilities.

The potential returns of investment in an amphibous ready force are many and varied. But this force must be truly ready, if it is to influence fast-breaking crisis situations.

That is why readiness is our *raison d'etre*. It has become a way of life for the Marine Corps. America cannot afford to be without an amphibious force-in-readiness, and we are dedicated to provide that force.

Against this background, I shall discuss our active and reserve forces in terms of our commitments and our readiness to meet them, touching, as well, upon our initiatives in force modernization to meet the challenges of the approaching years. I shall go into our manpower situation in some detail, for this will become an increasingly critical focus of interest as we approach an All Volunteer environment.

Let us begin with the "muscle" of the Marine Corps—our Fleet Marine Forces.

Fleet Marine Forces

As operating components of the Atlantic and Pacific Fleets, the Fleet Marine Forces include a total of three active duty Marine Divisions and Aircraft Wings, together with the combat and combat service support units required to support them. There is an additional Division/Wing Team, and supporting units, in the Marine Corps Reserve which can be deployed to combat 60 days after mobilization.

Active Fleet Marine Forces are currently deployed from the Western Pacific eastward to the Mediterranean Sea. The bulk of these forces are assigned to the Fleet Marine Force, Pacific (FMFPAC) which is organized to include two each of the tree active divisions and three active wings and appropriate supporting units.

The Western Pacific forces include those division and wing forces on Okinawa and Japan, organized as the III Marine Amphibious Force (III MAF). This organization includes the 3d Marine Division (—) (reinforced), the 1st Marine Aircraft Wing and supporting units. The III MAF is the [deleted] for Commander-in-Chief, Pacific (CINCPAC) with a primary area orientation for use in major contingencies in Korea or Southeast Asia as well as for minor contingencies and/or security assistance throughout the Pacific Command (PACOM) area.

III MAF provides a Marine Amphibious Unit (MAU), composed of a battalion landing team (BLT) and a helicopter squadron, for continuous forward afloat deployment with the Seventh Fleet. An additional BLT, and necessary amphibious lift, are available for immediate deployment when needed. If more helicopter platforms become available within PACOM assets, the standby BLT will be upgraded to a MAU.

The mid-Pacific forces consist of a Marine Brigade in Hawaii, which is composed of a headquarters, an infantry regiment (minus one battalion), an aircraft group, and necessary supporting units. These ground and aviation elements are, essentially, part of the Marine Corps forces stationed in the Western Pacific (WESTPAC).

Most of FMFPAC's forces in the continental United States are based in California and are organized as the I MAF: a Marine Division at Camp Pendleton; a Marine Aircraft Wing at El Toro (and Yuma, Arizona); and the combat support and combat service support elements under Force Troops Pacific command at Twentynine Palms. This West Coast division/wing team MAF, also [delete] has the capability to respond to contingency requirements.

Most of the major components of Fleet Marine Force, Atlantic (FMFLANT) are based in North Carolina. An East coast Marine Division and the Force Troops are stationed at Camp Lejeune; the Marine Aircraft Wing is stationed at Cherry Point and New River with two of its Marine Air Groups based at Beaufort, South Carolina. From these East coast units are provided the reinforced infantry battalion designated as the Guantanamo Ground Defense Force; a Marine Amphibious Unit (MAU) continuously deployed afloat with the Sixth Fleet in the Mediterranean; and, the Caribbean Ready Force.

FMFLANT units constitute the II Marine Amphibious Force (II MAF), which is committed to support of a myriad of contingency plans ranging from crisis-control operations on the littorals of the Atlantic to general war [delete].

The Navy's amphibious force is one of the most modern "mission forces" in the Fleets. On the other hand, the amount of amphibious lift capability available in 1973 will be at its lowest point since 1950.

READINESS

Consistent with their force-in-readiness role, the Fleet Marine Forces are manned at the highest possible level with trained Marines. Over half our total strength is assigned to the operating forces. Residual personnel turbulence associated with our draw down and our redeployment from Vietnam causes us to project an overall manning level of 85% for our division/wing forces during FY72. We are maintaining 90% manning in our forces assigned to the Western Pacific and the Atlantic regions. Our FY73 budget requests support 90% manning across the board for our division/wing forces.

The basic and continuing objective of Fleet Marine Force training is to maintain and improve combat readiness. Training is oriented toward refining the unique capability of the Fleet Marine Forces to conduct landing force operations as part of the Navy-Marine Corps team. This amphibious orientation is fundamental and continuous, pervading all aspects of unit training, which begins with small-unit operations ashore and afloat. Training is conducted in varying methods of amphibious assault, but stresses those in which both helicopters and surface assault means are employed.

Additionally, environmental training is required in varied conditions of climate, weather, terrain, and visibility. Training exercises are conducted in desert, jungle, and mountain terrain, as well as areas of snow and extreme cold.

Adequate quantities of supplies and new equipment are being procured to ensure that our logistic system is responsive to our force-in-readiness role. The Marine Corps operates an integral logistic support system designed for effective operation in peace and war, and is capable of rapid transition from one to the other. This system, which makes the Marine Corps essentially self-sufficient in logistics operations, is structured to be responsive to the needs of operating and supporting forces, and to provide optimum support to the individual Marine in combat. It is characterized by centralized management and decentralized distribution. It is a dynamic system, undergoing continuing refinement and improvement.

MARINE AVIATION

Marine aviation units in Vietnam ceased combat operations in May, 1971. Our withdrawal was accompanied by a reduction in aviation force levels. Our reduced aircraft inventory is modern and combat capable in all respects.

Our fighters are all F–4 Phantoms. Modernization is planned through acquisition of the F–14. We have introduced the AV–8A into the Fleet Marine Forces, and are currently evaluating this versatile V/STOL aircraft in light attack force for the 1980s, hinging upon the development and production of a second-generation V/STOL aircraft. We will continue to modernize our light attack and all-weather medium attack capabilities through procurement of the A–4M and A–6E, respectively.

Marine helicopter assets are modern and well-balanced, and are programmed to remain so through this decade. Our transport support force, on the other hand, had low priority during the Vietnam years, and requires modernization. Programming action has been initiated toward this end.

We are maintaining our combat crew replacement training groups. These will ensure our continued capability to provide trained aircrews for rapid emergency deployment of tactical squadrons.

Marine fixed-wing squadrons are augmenting Navy carrier air wings during CVA deployments to WESTPAC and the Mediterranean. Helicopter squadrons, organic to the landing forces, are also maintained aboard LPHs assigned to Amphibious Ready Groups continually deployed to these regions. An additional East cost helicopter squadron remains in standby status to react to Caribbean emergencies. The Caribbean fighter alert posture is enhanced by Marine F–4s, assigned to Key West on an alternate basis with Navy aircraft. Finally, the 1st Marine Aircraft Wing remains deployed in Japan and Okinawa.

With the transition from its wartime posture to three restructured, combat ready Wings nearing completion, Marine aviation is prepared to support our ground components wherever and whenever they may be committed.

MARINE CORPS RESERVE

The major component of the Marine Corps Reserve is the combat ready 4th Marine Division/Aircraft Wing team, designed to meet the Marine Corps' priority mobilization requirements. This team, the IV Marine Amphibious Force (IV MAF), is trained, organized, and equipped in the same manner as the MAFs of the Regular Establishment. This force remains in a high state of readiness, with the exception of a few recently restructured units. Current training programs, including the Five Year Cyclic Training Plan, will improve the readiness of these units in the near future, and continue to maintain the high state of readiness of all other units.

We began 1972 with 42,000 officers and men in the Organized Marine Corps Reserve, and approximately 210,000 individual Reservists available for service in the Class III Ready and Standby Reserve pool.

Equipment for the 4th Marine Division and units which support the Division/Wing team is on hand or identified for priority procurement.

The aircraft status of the 4th Marine Aircraft Wing has been significantly improved, but certain deficiencies remain—both in the number of aircraft assigned and their capabilities.

By the end of FY 72, all helicopter squadrons will be equipped with, or transitioning to, the same jet-powered models that are flown by the active forces. Although improved versions of the F–8 and A–4 aircraft have upgraded our fixed wing capability to some degree, the 4th Marine Aircraft Wing is still deficient in electronic counter-measure, air refueling, and all-weather attack and fighter capabilities.

Despite these soft spots, our Reserve air/ground team is trained and ready—ready to mobilize and deploy units to combat by M–60.

MANPOWER

The strength of the Marine Corps has virtually leveled off, down by over a third from a peak Vietnam total of 317,000 in 1969. Our end FY 73 request is for 198,000 active duty Marines. This will be adequate—but just adequate—to meet our commitments, as they now stand.

The Marine Corps must maintain its emphasis on quality if we are to remain a responsive ready force. The search for quality must begin in our recruiting and officer procurement efforts. Our standards in this regard have been raised to their pre-Vietnam levels. We have been assisted by recently enacted raises in pay and allowances, by special All Volunteer Force funding to enhance our recruiting capabilities, and by the recent abolishment of Mental Group IV recruiting quotas. These positive factors must be balanced against the hard-to-predict effects of fluctuations both in civilian job markets and in public esteem for the military, and of steadily declining draft pressure.

The sag in enlistments during the period last year when Selective Service legislation was not on the books provided a disquieting, though hopefully not prophetic, glimpse into the All Volunteer environment. Both quantity and quality suffered. The Reserves, whose enlistments were cut in half, were hardest hit. Officer procurement also dropped in our most draft-motivated program: the Officer Candidate Class. As a consequence, we have placed increased reliance on programs with longer lead time: the U.S. Naval Academy; the NROTC; and, the largest of the three, the Platoon Leaders Class (PLC) program. Recent legislation which provides financial assistance to PLC students will help, although results will be slow in appearing—through FY 73. We face a lean year or two in finding the number of good lieutenants we need.

The drive for quality merely begins in our recruiting programs; it is sustained through vigorous training.

Marine recruit training will remain as tough as ever. It will continue to stress fitness, discipline, and a professional approach to the mastery of individual combat skills. Above all, it will continue to build the unique Marine spirit, which is re-born with each graduating class of recruits. We will not hesitate to improve the system, though. Last November, we combined two separate steps—recruit and individual combat training—into a single eleven-week program supervised by our Recruit Training Command at San Diego. The experiment is working well, and will be implemented at Parris Island in a few months.

Our insistence on quality includes quality of spirit, as well. Last year's implementation of a comprehensive human relations training program was a

great stride forward in this area. The program, developed with the assistance of the American Institute for Research, has the goal of ensuring more constructive relations among Marines—and between Marines and people outside the Corps, both domestic and foreign. The initial thrust is in the area of most pressing need: race relations.

I am confident that 1972 will see further progress in our effort to rid the Corps of racial intolerance and discrimination. As a practical matter, such self-defeating characteristics are clearly incompatible with a high quality, professional force in readiness. As a result, there has been, and there continues, a determined and genuine drive throughout our ranks, and at every step of leadership and command, to come to grips with this most pressing and potentially destructive of our "people" problems. We fully recognize this situation and we cannot, and will not, tolerate among us those who either are unwilling, or unable, to contribute to the solution. Our main effort in moving toward that solution has been the initiation of our human relations training program, and we will continue along these lines in FY 73.

Another problem which clearly undercuts the quality and professionalism for which we strive is that of drug abuse. We are currently using all available resources to combat this problem through prevention, identification, enforcement, treatment and rehabilitation. We continue to maintain that the most effective means of dealing with this problem is through prevention: by education, training and information.

HABITABILITY

For the past several years, budget limitations have permitted funding of only a minimum of our urgent construction requirements. With the attendant realignment of priorities under peacetime projections, it has been possible to increase significantly the level of our military construction budget this fiscal year. Hopefully, this favorable trend will continue.

One of our major objectives has been and will continue to be the upgrading of our personnel support facilities. For example, since FY 70, well over half of our military construction funds has been devoted to upgrading our bachelor housing. In addition to new construction, we are continuing to renovate existing quarters which are structurally sound and which can economically be reconfigured to meet modern standards.

In the area of family housing, we are continuing the policy of relying upon the local community as the primary source of support wherever possible. Where the local community cannot provide economical and adequate housing, we will be turning to some new construction. Wherever possible, we are upgrading our current inventory to meet modern living standards.

With respect to our facilities, we have established a sound Environmental Quality Control Program. We are closely monitoring each of our activities and their progress in controlling air, water, and solid waste pollution. In addition we now require the submission of impact statements for any proposed program or action which might significantly affect the environment. And, of course, we are maintaining close liaison with all local, state, and Federal agencies to ensure that we understand and comply with the standards they promulgate.

MODERNIZATION

The Marine Corps has a comparatively small budget for Research, Development, Test, and Evaluation, because most Marine Corps requirements are common to Army, Navy, or Air Force ones. The few unilateral Marine Corps R&D projects generally stem from statutory responsibilities related to landing forces.

This small RDT&E budget causes us to pursue a "management by influence" policy of active interest and participation in other Service developments which potentially satisfy the unique requirements of the Marine Corps. Some examples of these projects are: such Navy programs as the Amphibious Assault Landing Craft (AALC), and the improved CH–53 helicopter; the Army's DRAGON and REDEYE missile programs; and the Air Force program which provides the Marine Air/Ground Intelligence System (MAGIS).

As we participate in the more sophisticated developmental programs, we will continue to procure upgraded versions of tested, "state of the art" equipment. Current and projected modernization plans call for improvements in general support and air defense artillery, as well as enhanced tank, anti-tank, amphibian tractor, and communications capabilities. The ability of Marine Corps engineer units to

provide support during the early stages of amphibious operations will be upgraded.

We will continuously seek new ways to improve our ability to shoot, move, and communicate.

SUPPLY

Concurrent with the Vietnam buildup, we received much new equipment. We have maintained this carefully, and brought every item of potential value back from Vietnam with us. Consequently, we are in excellent logistic shape, both in terms of equipment and supplies in the hands of our Marines, and on the shelf for future contingencies.

Our supply system is sound—tested and proved under combat and peacetime conditions. At the general support level, it is totally mechanized and compatible with all other DoD systems. Our current thrust is to improve our use of third generation computers and advanced management techniques at the direct support, or user, level. We will shortly consolidate many of our supply accounting functions in the FMF, and—through a very few strategically placed computers—relieve our operating forces from the burden of manually accounting for their material. However, we will produce a system which is capable of rapid transition to a combat environment.

Finally, we are continuing our long standing policy of relying on interservice support agreements or direct support from other integrated managers, wherever possible. Nevertheless, we now hold in our own system the required level of stocks to support our operating forces in their unique mission.

DATA SYSTEMS

Our recent experience in Vietnam has demonstrated the value of automated information systems. We are identifying and meeting needs for improved computer support.

This improved support will be directed primarily toward the Fleet Marine Forces. Marine Corps posts and stations will continue to operate with their present computers.

We are currently using a test bed, or laboratory, to determine precise operational requirements from which we will develop the specifications for tactical command and control systems which will be introduced in the 1980's.

In automation, as in our other efforts, we stress austerity and economic justification. As we continue to improve our planning, management, and integration of automated systems, we are subjecting these systems to unprecedented scrutiny to ensure their cost effectiveness.

Our efforts are focused on information management, rather than mere data processing—to provide correct, essential information to Marines when and where they need it.

CONCLUSION

Our FY 73 budget requests were prepared with our traditional emphasis on frugality, and with an eye to providing the maximum number of combat ready Marines with the Defense dollars allotted to us.

They provide funds necessary for pay and allowances on the improved scale recently authorized by the Congress.

They allow for further modernization of our forces by providing improved communications equipment, improved missiles, and by completing the buy of our new family of amphibian tractors.

Most important, they provide for the maintenance of our equipment and personnel in a high state of readiness for whatever missions we may be assigned. Since the bulk of these funds supports our manpower requirements, we are placing heavy emphasis on personnel management in order to achieve even greater productivity and increased efficiency of the Marine Corps air/ground team.

Mr. Chairman, this statement has treated you to a great deal of managerial discussion—essential to the maintenance of a ready force which has historically proved to be one of this Nation's most reliable assets. In formulating our readiness equation, though, we must not overlook a critical factor: the mental and emotional preparation of the individual Marine for the shock of combat, when he must face it. Individual readiness is still the key.

To quote a British observer, with the beleaguered defenders of the Pusan perimeter in August, 1950:

"I am heartened that the Marine Brigade will move against the Naktong salient tomorrow. They are faced with impossible odds, and I have no valid reason to substantiate it, but I have the feeling they will halt the enemy. . . . These Marines have the swagger, confidence, and hardness that must have been in Stonewall Jackson's Army of the Shenandoah. They remind me of the Coldstreams at Dunkirk. Upon this thin line of reasoning, I cling to the hope of victory."

Subsequent events, of course, justified his hope.

Mr. Chairman, less than ten percent of those Marines were combat veterans. But they were Marines, and they knew what they had to live up to.

Today's Marines are equally aware of the obligations attendant to the great trust our Country places in our abilities. We will continue to honor that trust.

This completes my statement. I await your questions.

NIXON DOCTRINE, FORCE STRUCTURE AND MANPOWER

General CUSHMAN. Naturally, I am very pleased to have this opportunity to present my very first posture report to this committee. My full statement for the record discusses the role of the Marine Corps and supporting national policies under the Nixon Doctrine and the associated strategy of realistic deterrence. Our force structure and deployments are discussed in terms of the readiness of our active and reserve forces to meet our commitments. Our manpower situation is reviewed in light of our efforts to recruit and maintain a top-quality force as we approach the all-volunteer environment.

FUNDING REQUESTS

This request includes funds necessary for pay and allowances on the improved scale authorized by the Congress. Further, the statement outlines our initiatives in modernizing our equipment and support systems to meet the challenges of the approaching years.

These include improved communications equipment and missiles and completing our buy of new amphibious tractors. It supports our fiscal year 1973 budget requests which are $2.1904 billion, 198,000 in regular troops, 45,000 reserve troops, and 16,800 civilian personnel.

These requests were prepared with our traditional emphasis on frugality and with an eye to providing the maximum of combat-ready marines for the defense dollars allotted to us.

This summarizes my statement, Mr. Chairman. I will be glad to answer questions.

MANPOWER

Chairman ELLENDER. I think we had a thorough presentation made of the number of people and the amount necessary to sustain them.

General CUSHMAN. Yes, sir; by General Wheeler. As you point out, we are manpower oriented, you might say, and it includes most of our budget.

Chairman ELLENDER. Any further questions?

Senator YOUNG. No, Mr. Chairman.

Admiral ZUMWALT. I would like to stress, Mr. Chairman, that never in all the years I have been associated with defense have I seen greater opportunity and flexibility given to the services to structure their own budget. Within sensible rules and the remarks that I have had to

make about the risk in the near years in order to improve and catch up in the out years should be taken in the context that I support this budget at its present level as the very best we can do within the money available.

QUESTIONS BY SENATOR THURMOND

Chairman ELLENDER. As I have stated, Senator Thurmond was unable to be here today but has asked that responses to questions he has supplied will be answered for the record. The questions and answers will appear at this point in the record.

(The information follows:)

CATEGORY IV PERSONNEL

Senator THURMOND. General Cushman, what percent of the Marine Corps enlisted personnel are so-called Category IV's?

General CUSHMAN. As of 31 December 1971, 13.1% of the Marine Corps enlisted personnel were in Mental Category, or Group, IV.

Senator THURMOND. Are the Marines trying to reduce this percent?

General CUSHMAN. Since 1966, the Marine Corps has been required to enlist a certain percentage of our recruits from Mental Group IV. However, the 1972 Defense Appropriations Bill, PL 92–204, directed that no further mandatory mental group recruiting quotas would be established. Some Mental Group IV Marines have served honorably and well, and our new higher enlistment standards provide the opportunity for exceptional applicants from this group to enlist in the Marine Corps. Because we now will accept for enlistment only those men whose educational attainment and aptitude, as indicated by pre-enlistment tests, make them excellent prospects, it is expected that the overall rate of Mental Group IV personnel in the Marine Corps will decrease.

EDUCATION OF MARINE RECRUITS

Senator THURMOND. What importance do the Marines attach to having all of their recruits possess at least a high school diploma?

General CUSHMAN. The Marine Corps considers a high school diploma as one indicator of quality in a recruit. Ideally, we would like for all of our recruits to be high school graduates. However, in certain circumstances, other factors can also be considered important predictors of success. Therefore, we have established a goal that at least 65% of our accessions be high school graduates in fiscal year 1972 and fiscal year 1973.

HARRIER TESTS

Senator THURMOND. General, have the HARRIER tests to date proved entirely successful?

General CUSHMAN. The limited testing required for the AV–8A has been successful.

Because the AV–8 was purchased as an "off the shelf" fully developed aircraft, the only tests required prior to service introduction were limited U.S. Navy Board of Inspection and Survey (BIS) Trials. The trials were conducted at the Naval Air Test Center, Patuxent River, Maryland, from 26 January to 15 April 1971. At the conclusion of the trials, the AV–8 was cleared for service with the conclusion that the AV–8 is a highly reliable aircraft and that mission versatility provided by V/STOL is an obvious enhancing characteristic.

Senator THURMOND. What disappointments have the Marines experienced to date with HARRIER?

General CUSHMAN. To date, the Marine Corps has not experienced any disappointments with the AV–8. To the contrary, all of our experience with the aircraft shows that it is an exceptionally effective, reliable aircraft. Since introduction of the AV–8 into the Marine Corps a year ago, we have:

1. Evaluated the AV–8 successfully at the Naval Air Test Center, Patuxent River, Maryland.

2. Trained pilots and ground crews in the first AV–8 squadron at MCAS Beaufort, South Carolina.

3. Operated from a deployed site 1800 miles from home base with no significant problems.

4. Operated successfully at sea from an LPH and LSD without the requirement for catapult and arresting gear.

5. Operated from unprepared sites similar to those which can be found in a combat area.

6. Flown over 2000 squadron operational hours without an accident.

As a result of test and operational flight experience to date, we have determined that:

1. The AV–8 weapon delivery system is excellent.

2. The AV–8 and the support concept provides the Marine Corps sustained deployment capability.

3. The AV–8 has significant potential as a fighter because of unique thrust vectoring capability.

4. The AV–8 is an easily maintained, highly stable, effective weapons delivery platform which will fill the role envisioned for it in amphibious operations.

As we acquire additional operational flight experience wtih the AV–8, we continue to find enhancing capabilities and characteristics of this unique first generation V/STOL aircraft.

Senator THURMOND. Have the HARRIER tests taken the aircraft to its full flight potential?

General CUSHMAN. AV–8 test and operational experience on land and at sea has exploited the full potential of the aircraft. These operations have included V/STOL flights from many kinds of surfaces, ranging from conventional airfields to unprepared macadam roads, and small amphibious ships. Maximum performance air combat maneuvering tests were conducted on the Pacific Missile Range, at Point Mugu, California, using the unique thrust vectoring capability of the AV–8. Preliminary results of these flights show that a significant improvement in maneuverability can be achieved when vectored thrust is used. This demonstration dramatically proved that the AV–8 is a formidable air-to-air opponent, capable of performing a secondary mission of air defense.

The aircraft has taken off with an ordnance load of over 8000 pounds. Following a vertical take-off, it has delivered a 3000 pound ordnance load on a target 50NM away.

The AV–8 is a fully operational aircraft that doesn't require further testing to capitalize on its full potential. Marine Corps operations to date have demanded the utmost from this aircraft and its performance has exceeded our expectations.

EQUIPMENT STATUS

Senator THURMOND. General Cushman, do the Marines have any serious equipment deficiencies?

General CUSHMAN. No, sir.

Senator THURMOND. What equipment did the Marines request that was disapproved at DOD level?

General CUSHMAN. The following items of equipment, or equipment programs, were disapproved at the FY 1972 revised, FY 1973 OSD/OMB budget review:

[Millions of dollars]

Item/program and quality:	*Costs*
Radar set, AN/TPS–63 (13)	3.3
Unattended ground sensor program	2.0
Radio set, TRC 157 (6)	.8
Combat photo system (1)	.2
Total	6.3

BUDGET STATEMENT OF REAR ADM. SAM H. MOORE

Chairman ELLENDER. At this point in the record there will appear the financial statement dealing with the fiscal year 1973 budget as prepared by Rear Adm. Sam H. Moore, Director of Budget, Department of the Navy.

(The statement follows:)

Mr. Chairman, Members of the Committee:

It is a privilege to appear before you to discuss the financial resources needed to support the Fiscal 1973 program requirements which Secretary Chafee, Admiral Zumwalt and General Cushman have described in their evaluation of the posture of the Navy and Marine Corps. The proposed Fiscal 1973 budget emphasizes improved readiness of forces and modernization of weapon systems in both the Navy and Marine Corps.

Secretary Chafee, Admiral Zumwalt and General Cushman have discussed the policies, assumptions and program planning which governed formulation of the budget. My statement is confined to the financial highlights of the Fiscal 1973 request.

BUDGET PLAN (TOA)

The Total Department of the Navy budget request for Fiscal 1973 is $25.7 billion, including $470 million for the 1 January 1972 pay increase. The following table shows, on a functional basis, a comparison of the Fiscal 1973 request with Fiscal 1972 including proposed supplementals:

FISCAL YEAR 1973 BUDGET—COMPARISON OF TOA

[In millions of dollars]

Function	Fiscal year 1972	Fiscal year 1973	Difference
Military personnel	6,833	7,199	+366
Operation and maintenance	5,512	5,518	+6
Procurement	8,872	9,650	+778
R.D.T. & E.	2,446	2,730	+284
Military construction	350	570	+220
Total	24,012	25,667	+1,655
Proposed supplementals	−807		
Adjusted total	23,205		

The Fiscal 1973 request, including the January 1 pay raise, represents an increase of $1,655 million from Fiscal 1972 (including the supplemental request of $807 million for pay increases, currency revaluation, health benefits and RDT&E). The major increases in the proposed budget are associated with improved readiness, modernization of weapon systems, and additional military personnel costs relating to volunteer force goals and strengthening of our reserve forces. Increases include the following:

	Million
Shipbuilding	$+554
Military personnel costs	+366
R.D.T. & E.	+284
Military construction	+220
Ship ordnance, and communications and electronic support equipment	+249
Missile programs in PAMN	+70
Marine Corps weapons and equipment	+63

These increases are offset by decreases in various programs, including:

	Million
Combat aircraft	$−89
Modification of aircraft	−77
Trainer aircraft (PAMN)	−26
Civilian personnel costs	−74
Central supply and maintenance (O. & M., N.)	−54
General purpose forces (O. & M., N.)	−45

For the convenience of the Committee, I would now like to discuss the request for each appropriation. In doing so, I would like to stress that the data under each appropriation include a continuation into Fiscal 1973 of the increased pay raise authorized during Fiscal 1972.

MILITARY PERSONNEL—NAVY

[In millions]

	Fiscal year—	
	1972	1973
Direct budget plan (TOA)	$5,082.6	$5,352.7
New obligational authority (NOA)	5,037.8	5,352.7
Obligations (direct)	5,082.6	5,352.7
Net expenditures	5,051.0	5,327.0

The funding request of $5,352.7 million for this appropriation in Fiscal 1973 is $270.1 million above the Fiscal 1972 program of $5,082.6 million. The increase is related directly to the increased pay rates effective 14 November 1971 and 1 January 1972.

The manpower end strengths remain relatively level, as indicated in the following tables:

	Fiscal year—	
	1972 estimate	1973 estimate
Yearend Strength		
Officers	73,424	72,198
Enlisted	524,529	525,231
Academy midshipmen	4,243	4,243
Total	602,196	601,672
Average Strength		
Officers	73,561	72,811
Enlisted	529,572	524,130
Academy midshipmen	4,251	4,243
Total	607,384	601,184

MILITARY PERSONNEL, MARINE CORPS

[In millions of dollars]

	Fiscal year—	
	1972	1973
Direct budget plan (TOA)	$1,475.4	$1,537.8
New obligational authority (NOA)	1,475.4	1,537.8
Obligations (Direct)	1,475.4	1,537.8
Net Expenditures	1,458.0	1,536.0

The appropriation request of $1,537.8 million in Fiscal 1973 is $62.4 million above the Fiscal 1972 program of $1,475.4 million. The increase is related directly to increased pay rates effective 14 November 1971 and 1 January 1972.

The number of active duty personnel to be financed in Fiscal 1973 is approximately at the Fiscal 1972 level, as shown in the following tables:

	Fiscal year—	
	1972 estimate	1973 estimate
YEAREND STRENGTH		
Officers	19,812	19,133
Enlisted	178,208	178,832
Total	198,020	197,965
AVERAGE STRENGTH		
Officers	20,515	19,402
Enlisted	182,768	178,989
Total	203,283	198,391

RESERVE PERSONNEL, NAVY

[In thousands]

	Fiscal year—	
	1972	1973
Direct budget plan (TOA)	$203,824	$230,640
New obligational authority (NOA)	203,824	230,640
Obligations (direct)	203,824	230,640
Net expenditures	192,000	227,000

The Fiscal 1973 request of $230.6 million for this appropriation proposes an increase of $26.8 million above the Fiscal 1972 program of $203.8 million. The higher pay rates effective 14 November 1971 and 1 January 1972 account for a major portion of the increase which also includes an increase in subsistence allowance for members of the ROTC from $50 to $100 per month. The budget plan provides for an increase in officer candidate members from 9,426 to 9,986. The numbers of reserve personnel in paid status to be financed with these funds are reflected in the table below:

AVERAGE STRENGTH

	Fiscal year—	
	1972 estimate	1973 estimate
Paid drill training	129,000	129,000
Other paid status	3,350	3,350
Officer candidate programs	9,426	9,986

RESERVE PERSONNEL, MARINE CORPS

[In thousands]

	Fiscal year—	
	1972	1973
Direct budget plan (TOA)	$71,272	$78,155
New obligational authority (NOA)	67,434	78,155
Obligations (direct)	71,272	78,155
Net expenditures	67,700	77,000

The Fiscal 1973 request of $78.2 million for this appropriation represents an increase of $6.9 million above the Fiscal 1972 program of $71.3 million. This increase is related directly to increased pay rates effective 14 November 1971 and 1 January 1972, and to the new subsistence allowance for Marine Corps officer candidates.

The numbers of reserve personnel in paid status to be financed with these funds are reflected in the following table:

AVERAGE STRENGTH

	Fiscal year—	
	1972 estimate	1973 estimate
Paid drill training	45,849	45,016
Other paid status	760	760
Officer candidate programs	3,281	3,519

OPERATION AND MAINTENANCE, NAVY

[In millions]

	Fiscal year—	
	1972	1973
Direct budget plan (TOA)	$5,145.5	$5,134.6
New obligational authority (NOA)	5,098.0	5,134.6
Obligations (direct)	5,145.5	5,134.6
Net expenditures	5,145.0	5,159.0

The Fiscal 1973 request of $5,134.6 million is $10.9 million below the Fiscal 1972 program of $5,145.5 million.

The Fiscal 1973 budget plan continues the efforts to improve material readiness of the lower forces supported by this appropriation.

The Navy plans to have 594 active fleet ships at the end of Fiscal 1973. This compares with 657 projected for the end of Fiscal 1972 and 702 ships at the close of Fiscal 1971. Included in the Fiscal 1973 active fleet ship inventory are 16 aircraft carriers compared to 17 in Fiscal 1972.

Average operating aircraft supporting the active and reserve programs will total 5,809 in Fiscal 1973, a reduction of 59 aircraft from Fiscal 1972. Fiscal 1973 funds will support 2,706,000 flying hours, compared with 2,753,000 in Fiscal 1972.

The Strategic Forces program will be increased $27.4 million in Fiscal 1973. The increase is due primarily to the overhaul of two more SSBN submarines in Fiscal 1973 than in Fiscal 1972.

The Fiscal 1973 request for General Purpose Forces reflects a decrease of $44.9 million below Fiscal 1972. This decrease is principally due to the reduced number of ship overhauls in Fiscal 1973, offset partially by increases for non-scheduled repairs and for ship operations due to higher fuel prices.

Intelligence and Communications activities reflect a Fiscal 1973 increase of $17.5 million. The Consolidated Cryptologic Program portion shows an increase of $4.5 million related to installation of new equipment and to fulfillment of requirements directed by the National Security Agency. The Intelligence increase of $4.3 million will provide improved capability to Fleet commanders in highly specialized sensor areas, including Undersea Warfare. The $5.0 million increase in Communications reflects the cost of automation of communications stations. In other areas of this program, $3.7 million was added for support of the World-Wide Military Management and Information Command System.

Funds included in Fiscal 1973 to support Reserve Forces are $17.1 million above Fiscal 1972. Special emphasis has been placed on support of Naval Reserve ships. The estimate provides for 16 Reserve ship overhauls, compared with 8 in Fiscal 1972. In addition, funds are requested to support the new Naval Reserve Training capability in River and Coastal Warfare.

The Fiscal 1973 Logistics Support Program, financed under the Central Supply and Maintenance budget activity, will decrease $53.6 million below the Fiscal

1972 level. This entails substantial manpower and program reductions associated with the decreasing size of the operating forces supported. The reductions are partially offset by the increasing cost of materials and services, the annualized value of civilian pay increases, and certain specific program increases. Included in program increases are the following: $12.2 million related to the establishment of one additional nuclear training facility required to ensure the training of a minimum number of personnel for nuclear ships; an additional $8.9 million for shipboard and shore pollution abatement; and, for the first time ,$21.0 million for Employee Workman's Compensation, previously financed under the Administration and Associated Activities Program.

The Training, Medical and Personnel Support Programs reflect an increase of $43.6 million over Fiscal 1972. The most significant increases are in personnel support programs and in medical care. Personnel support increases $16.5 million, $9.8 million of which is for the All Volunteer Force developed in response to the plan for the Armed Forces to move to a zero draft situation by 1 July 1973. The total All Volunteer Force Program estimate for Fiscal 1973 is $32.6 million and includes the extension of programs initiated in Fiscal 1972 plus expanded programs in recruiting and education. Other personnel support programs increase $6.4 million to continue Navy-wide programs begun in Fiscal 1972 in areas such as drug and alcohol education and rehabilitation, and in race and inter-cultural relations. The medical program increases by $22.3 million, including an increase of $15.5 million for the CHAMPUS Program.

The Administration and Associated Activities Program shows a net decrease of $3.0 million in Fiscal 1973. The lower request reflects the intent of Congress and the Secretary of Defense to reduce the size of headquarters activities and provide the minimum staff necessary to $14.6 million in Fiscal 1972, is being budgeted for in the Central Supply and Maintenance budget activity in Fiscal 1973. This decrease has been largely offset by an increase of $14 million in official mail costs.

Support of Other Nations will decrease by $15.0 million below the Fiscal 1972 level. This is due primarily to the planned turnover of various bases, boats, and associated support to the Vietnamese Navy.

OPERATION AND MAINTENANCE, MARINE CORPS

[In millions]

	Fiscal year—	
	1972	1973
Direct budget plan (TOA)	$366.0	$383.3
New obligational authority (NOA)	365.1	383.3
Obligations (direct)	366.0	383.3
Net expenditures	371.2	375.0

The fiscal 1973 budget request of $383.3 million is an increase of $17.3 million over the Fiscal 1972 program. The increase is necessary to provide for an expanded recruiting and examining effort, increased habitability standards, and additional collateral equipment for military construction projects. The Fiscal 1973 estimate provides for price escalation related to the full year impact of the classified pay raise, increased postage rates, currency revaluation and utility increases. It also provides for improved commissary store staffing, a consolidated civilian career training program, a new basic sequential training program for recruits, and an expanded drug abuse control program.

PROCUREMENT OF AIRCRAFT AND MISSILES, NAVY

[In millions]

	Fiscal year—	
	1972	1973
Direct budget plan (TOA)	$3,965.0	$3,871.2
New obligational authority (NOA)	3,855.0	3,871.2
Obligations (direct)	3,858.6	3,821.0
Net expenditures	3,352.0	3,362.0

The Fiscal 1973 budget plan provides for $3,871 million, a decrease of $94 million from the Fiscal 1972 budget of $3,965 million. The Fiscal 1973 budget includes $2,061 million for 282 combat, training and support aircraft; $1,041 million for aircraft support programs, including initial and replenishment spares, aircraft modification, and aircraft support equipment and facilities; $678 million for missile procurement ($323 million for POSEIDON and $355 million for other missiles and aerial targets); and $92 million for missile support programs and the satellite communication program.

New aircraft procurement programs include six VH–53D helicopters for the Executive Support Mission and procurement of five LC–130R ski-equipped transport aircraft in support of the National Science Foundation sponsored Deep Freeze Program. The S–3A procurement request is increased from 13 in Fiscal 1972 to 42 for Fiscal 1973 and is budgeted at $520 million.

The aircraft modification program includes the first production increment of the A–6A to E modification program, incorporating new solid-state circuitry in the computer, radar and weapons release systems.

In the missile area, the Fiscal 1973 budget includes fewer POSEIDON missiles than in Fiscal 1972; the initial increment of non-recurring funds ($10 million) to accelerate the ULMS program; the first increment of funds for the fleet satellite communication program; and initial procurement of CONDOR air-to-surface missiles.

SHIPBUILDING AND CONVERSION, NAVY

[In millions]

	Fiscal year—	
	1972	1973
Direct budget plan (TOA)	$3,010.2	$3,564.3
New obligational authority (NOA)	3,005.2	3,564.3
Obligations (direct)	2,792.4	3,165.7
Net expenditures	2,113.0	2,213.0

The request for Fiscal 1973 is $3,564 million, an increase of $554 million above the Fiscal 1972 budget. The request provides for 20 new construction ships and 9 conversions, an increase of 4 new construction ships and 1 conversion above Fiscal 1972.

Of the 20 new construction ships requested in Fiscal 1973, 16 represent the continuation of programs that were funded in Fiscal 1972. They include 6 high speed nuclear attack submarines (SSN–688 class), 7 anti-submarine warfare destroyers (DD–963 class), 2 rescue and salvage ships (ATS) and 1 submarine tender (AS). The 4 new ships include 2 high speed hydrofoil patrol ships (PHM) with a missile capability; 1 patrol frigate (PF), the first of a new class of small, less expensive escort ships possessing anti-submarine and anti-ship missile defense capabilities; and 1 destroyer tender (AD) to service both nuclear and non-nuclear frigates and destroyers. The funding request for these 20 new ships is $1,981 million.

The 9 conversions in the Fiscal 1973 budget include 6 ballistic missile firing submarines to be converted from POLARIS to POSEIDON missile capability; 2 guided missile frigates whose missile, sensor and fire control capabilities will be improved; and 1 submarine tender which will be converted to serve ballistic missile firing submarines. The proposed budget includes $391 million for these conversions.

Of the $952 million requested for advance procurement in Fiscal 1973, $252 million is associated with continuing programs and $700 million is for 4 new programs. The continuing programs include conversion of ballistic missile firing submarines, high speed nuclear attack submarines, and guided missile frigates. Advance procurement for new programs includes funds for the nuclear attack aircraft carrier, (CVN), the Underwater Long Range Missile System (ULMS), the Sea Control Ship (SCS), and for conversion of a nuclear powered guided missile frigate (DLGN).

The remaining $240 million in the Fiscal 1973 request is for outfitting material and post delivery work, cost growth related to completion of prior year programs, and for procurement of service craft.

OTHER PROCUREMENT, NAVY

[In millions]

	Fiscal year—	
	1972	1973
Direct budget plan (TOA)	$1,768.7	$2,023.2
New obligational authority (NOA)	1,641.6	2,023.2
Obligations (direct)	1,781.9	1,930.1
Net expenditures	1,685.0	1,626.0

The direct budget plan for Fiscal 1973 is $2,023 million, an increase of $254 million over the Fiscal 1972 budget. The Fiscal 1973 budget continues emphasis on fleet modernization, provides for significant anti-submarine warfare (ASW) efforts, and supports the air launched and ship launched ordnance programs. Fleet modernization is exemplified by the ship alteration program, funded at $278.0 million. A significant portion of this appropriation is devoted to ASW programs—about $495 million or 24%. Significant ASW programs include CAESAR ($72 million), the SQQ–23 Sonar ($25 million), Sonobuoys ($65 million), and the MK–48 Torpedo ($157 million). Air launched ordnance funded at $223 million and ship gun ammunition funded at $50 million provide for support of Southeast Asia, training, and an increment towards meeting inventory objectives.

New initiatives or increased efforts in several programs are also included in this appropriation. Ship and shore terminals for both the Navy Tactical and Defense Satellite Communications Systems are funded at $38 million to provide a much needed improvement in communications. The initial procurement of Improved Point Defense Missile Systems (NATO Sea Sparrow) is included at $36 million. This system is designed to improve the close-in defense of ships.

Another new program, the Close-in Weapon System (Vulcan/Phalanx), is funded at $23 million to provide a last-ditch defense against incoming anti-ship missiles. A modest program of $7 million is also included to provide an interim surface-to-surface missile system pending the development of the HARPOON system.

Other programs funded in this appropriation include spare parts, vehicles, ADP equipment, and industrial plant equipment. While these programs do not appear glamorous, they are the "nuts and bolts" of procurement and are vitally important to insure the readiness of the operating forces.

PROCUREMENT, MARINE CORPS

[In millions]

	Fiscal year—	
	1972	1973
Direct budget plan (TOA)	$128.1	$191.1
New obligational authority (NOA)	103.1	191.1
Obligations (direct)	234.4	254.0
Net expenditures	185.0	222.0

The Fiscal 1973 budget request of $191 million represents an increase of $63 million over the FY 1972 budget plan of $128 million. New programs include procurement of the Improved HAWK Missile System ($21 million) which will provide for a significantly improved air defense capability, and the Radar Course Directing Central AN/TPQ–27 ($26 million) which will provide increased accuracy and reliability in controlling aircraft in direct air support missions. In addition, the budget includes the fourth and final year buy of the multi-year contract for the family of LVTP–7 Amphibious Assault Vehicles. The remainder of the budget request supports Marine Corps general purpose forces with weapons, ammunition and related equipment through the Fiscal 1973 funded delivery period.

	Fiscal year—	
	1972	1973
Direct budget plan (TOA)	$2,445.6	$2,730.0
New obligational authority (NOA)	2,425.6	2,730.0
Obligations (direct)	2,513.2	2,726.0
Net expenditures	2,433.0	2,463.5

The Fiscal 1973 request of $2,730 million is above the Fiscal 1972 budget plan of $2,446 million. The ULMS program requires an increase of $380 million over the Fiscal 1972 budget plan. The balance of the RDT&E, N program for Fiscal 1973 reflects a reduction of $96 million from the Fiscal 1972 budget plan.

The proposed budget reflects changes in program and funding emphasis as well as the normal variation in funding related to the evolutionary progress of developmental projects. Although in past years the RDT&E, N budget has been based upon funding annual program increments, a special effort has been made to formulate the Fiscal 1973 budget with full recognition of the incremental funding principles set forth by Congress. That action, plus other special management effort, is expected to result in a significant reduction in the unobligated balance at the end of Fiscal 1973.

DEPARTMENT OF THE NAVY OBLIGATIONS AND UNOBLIGATED BALANCES

Fiscal 1973 obligations will total approximately $26,897 million, an increase of $1,110 million over estimated Fiscal 1972 obligations of $25,787 million.

Unobligated balances at the end of Fiscal 1973 will amount to approximately $5,136 million. This compares with $4,509 million estimated for the end of Fiscal 1972. The increase of $627 million stems largely from the fact that the Fiscal 1973 budget plan provides for a TOA increase of $1,282 million in the Procurement, RDT&E, and Military Construction accounts over Fiscal 1972.

The following table sets forth the significance of procurement dollars in relationship to total Department of the Navy with respect to obligational availability, obligations, and unobligated balances for Fiscal 1971, 1972 and 1973.

FISCAL YEARS 1971–73

OBLIGATIONAL AVAILABILITY, OBLIGATIONS AND BALANCES

[In millions]

	Available for obligation		Obligations		Unobligated balances at end of year	
	Amount	Percent	Amount	Percent	Amount	Percent
1971:						
Total	$28,419	100.0	$23,625	100.0	$4,779	100.0
Procurement	12,167	42.8	8,080	34.2	4,087	85.5
1972:						
Total	30,296	100.0	25,787	100.0	4,509	100.0
Procurement	13,090	43.2	9,116	35.4	3,973	88.1
1973:						
Total	32,033	100.0	26,897	100.0	5,136	100.0
Procurement	14,114	44.1	9,615	35.7	4,499	87.6

Outlays and Unexpended Balances

Department of the Navy outlays in Fiscal 1973 will be approximately $22,789 million. This will be $432 million above estimated Fiscal 1972 outlays of $22,357 million.

A functional distribution of Fiscal 1971, 1972, and 1973 outlays is shown in the following table:

FISCAL YEARS 1971–73

OUTLAYS BY FUNCTION

[Dollars in millions]

	Actual 1971		Estimate 1972		Estimate 1973	
	Amount	Percent	Amount	Percent	Amount	Percent
Military personnel	$6,407	29.1	$6,769	30.3	$7,167	31.4
Operation and maintenance	5,493	24.9	5,517	24.7	5,534	24.3
Procurement	7,300	33.1	7,335	32.8	7,423	32.6
R.D.T. and E	2,405	10.9	2,433	10.9	2,464	10.8
Military construction	310	1.4	459	2.1	304	1.3
Revenue and management funds, etc	166	.8	−124	−.6	−71	−.3
Other, trust funds, etc	−30	−.1	−32	−.1	−32	−.1
Total	22,051	100.0	22,357	100.0	22,789	100.0

Outlays for military personnel and for operations and maintenance, which when combined might be considered to reflect the cost of operating and maintaining the operating forces, will constitute approximately 55.7 percent of total outlays in Fiscal 1973 compared with 55.0 percent in Fiscal 1972 and 54.0 percent in Fiscal 1971.

The following table shows funds available for expenditure in Fiscal Years 1971, 1972, and 1973, as well as the unexpended balance at the end of each year.

FISCAL YEARS 1971–73

EXPENDITURE AVAILABILITY AND UNEXPENDED BALANCES

[in billions of dollars]

	Total available for expenditure	Unexpended balance at end of year
Year:		
1971	38.1	16.0
1972	39.7	17.3
1973	42.9	20.1

Unexpended balances are expected to increase approximately $2.8 billion at the end of Fiscal 1973 over Fiscal 1972. This increase is largely the result of a $1.3 billion TOA increase in the continuing accounts in Fiscal 1973 plus the fact that during the past three years a higher proportion of procurement funds has been placed in slower spending areas, particularly shipbuilding and aircraft.

CIVILIAN PERSONNEL

The Department of the Navy direct hire employment on 30 June 1971 was 350,198. During Fiscal 1972, it is planned to reduce 16,634 positions to a level of 333,564 by 30 June 1972. Significant reductions totaling 17,210, resulting primarily from changes in funded workload, are identified in naval shipyards (−5,364), aircraft rework facilities (−1,577), ammunition depots and weapons plants (−1,503), Navy fleet shore activities (−3,964), supply and other logistics support activities (−2,694), Marine Corps field activities (−1,272), military construction activities (−410), and headquarters (−426). The reductions are offset in part by increases for implementation of the All Volunteer Force (+1,282) and the Drug Abuse Prevention and Rehabilitation Program (+335). Also increases have been submitted for the Military Sealift Command (+227) as well as for the three laboratories which are participating in Project REFLEX (+530). Other changes involving a net reduction of 1,798 positions account for the balance of the difference between Fiscal 1971 and Fiscal 1972.

Civilian employment at 30 June 1973 is estimated at 329,479. This represents

a net reduction in the overall employment level from 30 June 1972 of 4,085. This net change is to be accomplished by further decreases in the naval shipyards (—2,344), aircraft rework facilities (—1,107), Military Sealift Command (—257), and Navy fleet shore activities and supply depot operations (—1,499). Major reductions discussed above are offset in part by increases for expansion of the All Volunteer Force (+756), the Drug Abuse Prevention and Rehabilitation Program (+85), the laboratories in Project REFLEX (+271), and military training (+133). Additionally, increases have been provided for Marine Corps participation in the Consolidated Civilian Career Training Program (+136), military billets converted to civilian spaces (+132), and for improvement of services at commissary stores (+95). Miscellaneous other changes involving a net decrease of 486 account for the balance of the reduction.

CONCLUSION

Mr. Chairman, this concludes my statement. I will be pleased to attempt to answer any questions you may have with respect to the financial aspects of the Fiscal 1973 budget.

PENDING 1972 SUPPLEMENTALS

Chairman ELLENDER. In the table on page 1 of your statement there is a reduction of $807,000,000 for "Proposed supplementals." Please explain why this is a deduct.

Admiral MOORE. This table was set forth in my statement primarily to show on the same "total" line comparable figures for fiscal years 1972 and 1973. For fiscal year 1972 our currently proposed TOA program (including proposed supplementals of $807 million) is $24,012 million which compares with the proposed fiscal year 1973 program of $25,667 million. The $807 million in proposed supplementals is shown as a reduction in order to arrive at an adjusted total of $23,205 million which represents the currently approved Congressional program.

TOA AND NOA

Chairman ELLENDER. Since this statement will appear in the published record, for the sake of clarity it might be wise for you to provide a statement as to the differences between "Total obligational authority" (TOA) and "New obligational authority" (NOA) as they are referred to on page 3.

Admiral MOORE. The difference of $44.8 million between the "Total obligational authority" figure of $5,082.6 million for "Military Personnel, Navy," and the "New Obligational Authority" figure of $5,037.8 represents a proposed transfer of unobligated balances which is being made from the "Procurement, Marine Corps," account under the authority of section 736, Public Law 92-204, to fund supplemental requirements. Usually TOA and NOA for the annual accounts are the same. However, in fiscal year 1972, under the authority provided by the Congress in section 736 requirements in annual accounts are being funded in part by transfer from funds previously authorized by the Congress.

INCREASES IN PROGRAMS

Chairman ELLENDER. On page 2 there is a list of both increases and decreases by major category. Disregarding both military and civilian pay increases and the effects of inflation, can you indicate generally what other major increases are included from fiscal year 1972 to fiscal year 1973?

Admiral MOORE. In my statement, I set forth increases amounting to $50 million or more in various programs. Disregarding the military personnel appropriations where the additional funds requested relate almost entirely to increased pay rates, the following are increases at the budget activity (program) level in excess of $5 million, not including those set forth in my statement:

	Million
O. & M.N.:	
Training medical and personnel support programs	+$44
Strategic forces program	+27
Inteligence and communcations program	+18
Reserve Forces program	+17
O. & M., M.C.:	
General purpose forces	+ 8
Training, medical and personnel support programs	+10
PAMN:	
Aircraft support equipment and facilities	+24
Other aircraft (LC–130R)	+32
OPN:	
Civil engineering	+10
Personnel and command support equipment	+7
Military construction, Naval Reserve	+5

INTELLIGENCE INCREASE

Chairman ELLENDER. You refer to an intelligence increase of $4.3 million. How will this affect the number of military and civilian personnel in this area?

Admiral MOORE. The increase of $4.3 million in intelligence will cover the cost of an increase of 111 civilians. None of this money will pay military personnel.

NAVAL RESERVE SHIPS

Chairman ELLENDER. I note you plan 16 reserve ship overhauls for fiscal year 1973. Please describe the number of ships in the reserve fleet, as well as their state of readiness generally.

Admiral MOORE. By the end of fiscal 1972, the Naval Reserve Force will contain 53 ships; 31 destroyers, four destroyers escorts, six oceangoing minesweepers, and 12 coastal minesweepers. In fiscal 1973 the Naval Reserve will increase to 58 ships. This is the result of the addition of seven oceangoing minesweepers and a decrease of two coastal minesweepers. By June of this year, 75 percent of the Naval Reserve Force ships will have recently been added from the active fleet, replacing ships that were in a lesser state of material condition and modernization. These ships are capable of employment with the active fleet and performing missions to meet contingency situations. Sixteen overhauls are programmed for fiscal 1973 to insure the retention of this capability.

UNOBLIGATED BALANCES

Chairman ELLENDER. Most of the items you refer to in your statement are covered more fully elsewhere in other presentations. However, I wish you would describe the reason for the increase in unobligated balances a bit more fully than appears on page 17.

Admiral MOORE. Unobligated balances at the end of fiscal 1973 will amount to approximately $5,136 million, an increase of $627 million over the $4,509 million at the end of fiscal year 1972. The increase consists primarily of the following:

$511 million—81 percent of the total—relates largely to the $1,282 million in increased TOA requested in fiscal 1973 for the procurement accounts, and represents the amount which experience indicates will not be obligated in the year in which Congress provides the funds. Most of the $511 million—63 percent—is in "Shipbuilding and conversion, Navy."

$67 million—11 percent of the total—relates to an increase in unobligated prior year funds at the end of fiscal 1973 versus the end of fiscal 1972. This increase results primarily from the shipbuilding program where funds are obligated at a slower rate than in the other procurement appropriations and are phased with the timing of completion of ships.

$49 million—8 percent of total—relates to an increase in unobligated reimbursable orders at the end of fiscal 1973 compared with the end of fiscal 1972.

UNEXPENDED BALANCES

Chairman ELLENDER. Similarly, I note on page 19 a gradual increase in unexpended balances. Please explain this more fully, particularly in relation to the shipbuilding and aircraft items, which you mention as bringing this about.

Admiral MOORE. The Navy's unexpended balance at the end of fiscal 1973 will total $20.1 billion, an increase of $2.8 billion from the $17.3 billion at the end of fiscal 1972. The increase of $2.8 billion results largely from two factors. First, the proposed increase of $1.3 billion in fiscal 1973 TOA over fiscal 1972 for the procurement accounts will result in outlays of approximately $300,000 in fiscal 1973 and an increase in the unexpended balance of approximately $1 billion. Second, since fiscal 1969, there has been a substantial increase in funds for "Shipbuilding and procurement of aircraft and missiles"—the slower spending areas—compared with "Other procurement, Navy," and "Procurement, Marine Corps," which, during the height of the SEA conflict, contained large amounts in quick spending funds for ordnance and ammunition. A comparison of TOA for PAMN and SCN with OPN and PMC since fiscal 1969 shows the changing pattern in our programs.

TOA FOR PROCUREMENT APPROPRIATIONS

[In millions of dollars]

Appropriations	Fiscal year—				
	1969	1970	1971	1972	1973
PAMN and SCN	4,227	5,295	5,699	6,975	7,435
OPN and PMC	3,074	2,540	1,927	1,897	2,214
Total	7,301	7,836	7,627	8,872	9,650

As a result of this change, the unexpended balances for PAMN and SCN have increased substantially while the balances for OPN and PMC have decreased substantially as the following data shows:

UNEXPENDED BALANCES IN PROCUREMENT APPROPRIATIONS

[In millions of dollars]

Appropriation	End fiscal year 1969	End fiscal year 1973	Difference
PAMN	4,593	5,309	+716
SCN	4,773	7,781	+3,008
OPN	3,218	2,566	−652
PMC	963	447	−516
Total	13,547	16,103	+2,556

SUBCOMMITTEE RECESS

Chairman ELLENDER. The subcommittee will recess until 10 o'clock tomorrow morning.

(Whereupon, at 4:40 p.m., Wednesday, February 23, the subcommittee was recessed, to reconvene at 10 a.m. Thursday, February 24.)

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1973

TUESDAY, FEBRUARY 22, 1972

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee met at 10 a.m., in room S–126, the Capitol, Hon. Allen J. Ellender (chairman), presiding.

Present: Senators Ellender, Young, and Allott.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE NAVY

MILITARY PERSONNEL, MARINE CORPS

STATEMENT OF MAJ. GEN. E. B. WHEELER, U.S. MARINE CORPS, ASSISTANT CHIEF OF STAFF, G–1 (MANPOWER AND PERSONNEL), HEADQUARTERS, MARINE CORPS

ACCOMPANIED BY:

MAJ. GEN. A. J. ARMSTRONG, U.S. MARINE CORPS, ASSISTANT CHIEF OF STAFF, G–4, LOGISTICS, HEADQUARTERS, MARINE CORPS

REAR ADM. S. H. MOORE, U.S. NAVY, DIRECTOR OF BUDGET AND REPORTS, OFFICE OF THE NAVY COMPTROLLER

COL. R. L. MULFORD, U.S. MARINE CORPS, HEAD, BUDGET SECTION, G–4, HEADQUARTERS, MARINE CORPS

COL. E. Y. HOLT, U.S. MARINE CORPS, HEAD, BUDGET BRANCH, FISCAL DIVISION, HEADQUARTERS, MARINE CORPS

LT. COL. S. A. CHALLGREN, U.S. MARINE CORPS, HEAD, BUDGET/PROGRAM SECTION, G–1, HEADQUARTERS, MARINE CORPS

MAJ. W. C. MIESCH, U.S. MARINE CORPS, HEAD, FISCAL SECTION, DIRECTOR OF MARINE CORPS RESERVE

C. H. CLARK, DIRECTOR, OPERATIONS DIVISION, OFFICE OF THE NAVY COMPTROLLER

F. D. ROBENHYMER, HEAD, MILITARY PERSONNEL BRANCH, OFFICE OF THE NAVY COMPTROLLER

CAPT. G. H. SEYMOUR, U.S. NAVY, OFFICE OF THE NAVY COMPTROLLER

CAPT. J. L. WOODBURY, U.S. NAVY, OFFICE OF THE NAVY COMPTROLLER

D. C. SINCLAIR, OFFICE OF THE SECRETARY OF DEFENSE (COMPTROLLER)

BUDGET REQUEST

Chairman ELLENDER. The subcommittee will come to order.

This morning we begin our consideration of the Navy and Marine Corps budget requests for fiscal year 1973. Secretary Chafee, Admiral

Zumwalt, and General Cushman cannot be here today because of a prior commitment. We are scheduled to hear testimony on all of the Marine Corps appropriations as well as the Navy personnel appropriations today. Today's proceedings will be printed following tomorrow's testimony.

The first appropriation to be considered is Military personnel, Marine Corps, for which the fiscal year 1973 estimate is $1,537,792,000, of which $80,792,000 is for the January 1, 1972, pay raise.

MANPOWER PROGRAM

Chairman ELLENDER. The principal witness is Maj. Gen. Edwin B. Wheeler, Assistant Chief of Staff.

You may proceed, General.

PROGRAM AND FINANCING

Chairman ELLENDER. At this point in the record there will appear certain program and financing information from the justifications.

(The information follows:)

DEPARTMENT OF DEFENSE—MILITARY PERSONNEL, MARINE CORPS

PROGRAM AND FINANCING (IN THOUSANDS OF DOLLARS)

	1971 actual	1972 estimate	1973 estimate
Program by activities:			
Direct program:			
1. Strategic forces	759	916	1,001
2. General purpose forces	800,531	844,811	908,306
3. Intelligence and communications	14,032	15,828	17,308
5. Guard and Reserve	30,439	33,755	35,894
6. Research and development	566	577	579
7. Central supply and maintenance	19,398	18,584	17,255
8. Training, medical, and other general personnel activities	534,198	491,930	500,626
9. Administration and associated activities	44,985	53,284	53,699
10. Support of other nations	16,732	15,701	3,124
Total, direct program	1,461,640	1,475,386	1,537,792
Reimbursable (total)	11,895	6,500	6,200
Total obligations	1,473,535	1,481,886	1,543,992
Financing:			
Receipts and reimbursements from—			
Federal funds	−9,372	−4,654	−4,094
Non-Federal Sources [1]	−2,523	−1,846	−2,106
Unobligated balance lapsing	6,968		
Budget authority	1,468,608	1,475,386	1,537,792
Budget authority:			
Appropriation	1,468,608	1,332,550	1,457,000
Proposed supplemental for Military Pay Act increases		101,150	
January 1972 pay increase supplemental/amendment		41,686	80,792

[1] Reimbursements are derived from sale of meals and clothing to service members (10 U.S.C. 7601).

The amounts shown as January 1972 pay increase supplemental/amendment are not distributed to each individual appropriation in the fiscal year 1973 President's budget, but are reflected as a oneline defensewide contingency amount. The amounts shown above are estimates, pending final determination of the amounts to be requested when supplemental and amended estimates are formally transmitted.

General WHEELER. Mr. Chairman and members of the committee, it is a privilege to present to you the highlights of the Marine Corps

military manpower program for fiscal year 1973, a summary of the military requirements upon which it is based, and the budget estimate of the military personnel appropriation which supports it.

Before discussing the current manpower picture in the Marine Corps, it is helpful to recall fiscal years 1970 and 1971 as a period of great personnel turbulence caused by large-scale strength reductions and troop redeployments resulting from a reduced Vietnam role.

Marine Corps active duty manpower reached its Vietnam war peak of 317,400 in March of 1969. In the 2 fiscal years following that, the Marine Corps reduced its strength over 97,000, a reduction of about one-half the planned end strength for fiscal year 1972.

Chairman ELLENDER. Is 317,400 the largest number you have ever had in your history?

General WHEELER. No, sir. During World War II, Mr. Chairman, we had almost 500,000 at one time, although it is interesting that we had 130,000 more Marines in uniform during Vietnam, than we did in World War II when we only had a total of 600,000.

RESERVES

Chairman ELLENDER. You had not called up the Reserves either.

General WHEELER. In World War II, yes, sir.

Chairman ELLENDER. I mean in Vietnam.

General WHEELER. In Vietnam, no, sir.

Chairman ELLENDER. How many were in the Reserves at that time during the Vietnam war?

General WHEELER. Of Reserves?

Chairman ELLENDER. In the Marine Reserves that you didn't call up.

General FRIBOURG. In drill pay status about 48,000 Reserves.

Chairman ELLENDER. I am sure you are all familiar with the criticism of this committee over the fact that very few of the Reserve and Guard forces were called to active duty to meet the requirement for increases in the Active Forces for Southeast Asia.

Secretary Laird has announced a new policy whereby the Reserve and Guard will be called to active duty to meet any additional requirement for increases in the Active Forces in the future. I think this is a sound and fair policy, and I will be sorely disappointed if it is not followed.

You may proceed, sir.

TROOP REDUCTIONS AND REDEPLOYMENTS

General WHEELER. The early release programs required to achieve this reduction induced a considerable amount of personnel turbulence. Associated with this was the large redeployment of about 80,000 marines serving in Vietnam. The combination of large-scale strength reductions and massive troop redeployments combined to make fiscal year 1971 one of the most turbulent in Marine Corps history. In fact, during our combat commitment in Vietnam, we turned over an average of half the Marine Corps strength each year for 6 years.

Fiscal year 1972 is, by contrast, a stabilized period and we envision fiscal year 1973 will be a year of increased readiness in the force.

Some of the personnel turbulence will still be with us in fiscal year 1972, but we are stabilizing with a proportionately smaller strength reduction of 14,000. The only early release programs remaining pertain to a small number of enlisted personnel returning from overseas with minimal time remaining on duty, an involuntary officer early release program ending in June 1972, and a small number of voluntary officer early releases required to achieve the authorized end strength for fiscal year 1972. By the end of this fiscal year, the enlisted strength will have stabilized at 178,000 with only officer reductions planned for fiscal year 1973. With stability achieved in fiscal year 1972, increased manpower readiness will result in fiscal year 1973.

FACTORS INFLUENCING BUDGET

There are a number of factors influencing this appropriation request which should be discussed. Primary among them was the passage of Public Law 92–129, which provided a much needed raise in basic pay of junior servicemen. Consistent with our long standing intent to reestablish a more deliberate promotion flow, and push the base of the enlisted pyramid to the lower grades as in pre-Vietnam years, we plan to lengthen to some degree the times in grade between promotions. These actions will not denigrate the valuable effect of these raises, but will space them out a bit. The cost savings attributable to this action was $1.3 million in fiscal year 1972 and $5.0 million in fiscal year 1973, which reduced our budget requests by those amounts.

Another factor influencing our manpower program is increasing technological demands brought about by the more complex tools of war and the management devices to insure their effective employment. These generally decrease the requirement for personnel performing manual, raw-data retrieval activities but increase the requirement for personnel to analyze the volume of information produced. The result is better management of resources.

The final factor I would like to discuss which influences our manpower program is our fixed operating costs associated with base support. The Marine Corps will have reduced its strength by nearly 120,000 from its peak wartime strength with no change in the number of permanent supportnig bases.

There is a certain fixed overhead which exists with each facility; and, thus, as we draw down our strength, the percentage of our manpower resources which are used to man permanent bases increases. The Marine Corps recognizes this and the fact that manpower resources might be conserved with a lesser number of bases. However, should such economies be effected, the surge capability, or capacity to rapidly expand the force to full structure and manning in time of war or increased national peril, would be greatly decreased.

DETERMINATION OF MANPOWER REQUIREMENTS

Congress has requested that a detailed discussion of how manpower requirements were developed be included as a part of the military personnel appropriation witness statement. Therefore, I will briefly outline the requirements determination process in order to illustrate the in-depth analyses which undergird our budget requests.

The Marine Corps is manpower intensive—over four out of five Marine Corps dollars are for manpower. Consequently, we take the development of our manpower requirements very seriously.

The management of military manpower, however, is more complex than its civilian counterpart. The total military manpower requirement for the Marine Corps stems from its roles and missions. But, unlike most civilian industries, people with established military skills and experience cannot enter laterally. Since there is no lateral entry, wartime requirements have to be anticipated to insure that long lead-time grades and skills will be available.

Manpower determination is a complex, iterative process which meshes with the planning, programing and budgeting system with which you are familiar. It extends over a 3-year period and interfaces at many points during the cycle. The determination is a five-faceted process: force levels, grades and skills, organization validation, task analysis and policy consideration. All five proceed simultaneously and more or less continuously. The principal facet, however, is the determination of force levels.

FORCE LEVELS

Our force levels are directly related to the national strategy and objectives, our roles and missions, and to the fiscal guidance. They are developed through several iterations paralleling the planning, programing and budgeting system. The first estimates of force levels, derived by balancing major units and capabilities against threats, are fiscally unconstrained and based on the assumption that tables of organization, tasks, policies, and grades and skills remain constant.

In the second iteration, however, we recommend force levels within prescribed dollar constraints and identify the increased risk, as well as incorporate the latest table of organization and policy data. Detailed troop lists are prepared. Then, by priority, some units are not manned at all while other units have manning levels imposed, and estimates of trainees, transients, patients, and prisoners are adjusted until strengths within fiscal guidance are achieved.

This force level determination process proceeds too rapidly to permit rethinking each basic organization every year. However, we rely upon a continuing, in-house studies effort which constantly revalidates basic concepts. Manpower in the present budget request is rooted in post-Vietnam studies which began in 1967. The latest study was completed in December of 1971.

The 1968 study group was charged with a complete review of roles, missions and tasks and was directed to provide recommended concepts of employment, organization and posture. Limited in conclusions only by law, overall military structure, and the requirement to support established U.S. strategy, the group went down to the lowest structural unit in the Marine Corps, the four-man fire team, to begin its evaluation and proceeded up the structure to a full, wartime, Marine air-ground team with priorities and trade-offs at each step. Both the analysis and the recommendations were reviewed by a panel of generals as well as the Commandant's staff before going to the Commandant for decision. These decisions then became the Commandant's guidance to his staff for the development of the troop lists underlying the fiscal years 1972 and 1973 budgets.

GRADES AND SKILLS

The second facet of manpower determination is aggregation of grade and skill requirements from the tables of organization. In order to budget for and manage Marine Corps manpower, however, the total population is subgrouped by grade, skill, and length of service. Continuous analysis in this area is fully evaluated and incorporated in each budget submission. Utilizing a computerized data base, the billets from tables of organization are summed and adjusted downward to manning levels within end strength constraints. This produces a statement of billets to be filled. Then the projected individuals proportioned by the various subgroupings are added. The final result is a statement of our projected end fiscal year manpower needs. Plans are then made to steer the inventory to that objective.

TABLE OF ORGANIZATION VALIDATION AND CHANGES

The third facet of requirements determination is table of organization validation. As long as weapons, basic tactics, and span of control concepts remain unchanged, the fighting force tables of organization will remain relatively constant. Manpower levels are adjusted by adding or subtracting units and their attendant capabilities, or by manning level adjustments with fluctuations in personnel readiness.

The general support area cannot be handled quite so easily. Here manpower requirements ultimately derive from analysis of tasks, work units and facilities loading. Consequently, general support tables of organization are subject to constant review and frequent update, stimulated by annual inspections, periodic manpower surveys, and staff visits. Furthermore, recent fiscally constrained Marine Corps strengths have caused us to direct strength reductions and to request recommendations from the field on how to accomplish them.

The validation of officer billets, specifically for lieutenant colonel through general, includes an evaluation of prospective grade assignments consistent with the following criteria:

1. Complexity of mission, tasks, and functions and span of control to be faced by the billet assignee.

2. Resources to be managed. The quantity of men, material, and money to be managed dictate, as a practical matter, those billets that logically must be filled by senior officers.

3. Authority required in representing service(s)/government interests within the Government of the United States and/or the government(s) of foreign powers. A grade commensurate with the grade of those with whom the billet incumbent will be dealing is logically required.

4. General and/or specific experience required to meet job requirements. Many billets require specific job experiences, normally in a progressional pattern.

5. Professional education required. A specific criterion always applied in the validation of senior officer billets is the level of military schooling required to do the job.

6. Competence and professional maturity required. Grade is an indirect, but significant, indicator of these factors. Promotions indicate a relative measure of professional maturity and competence through the successively more demanding selection process.

7. Motivational factors—

(*a*) Pay commensurate with responsibility.

(*b*) Seniority over personnel supervised.

(*c*) Equivalency of grade to counterparts with whom business is conducted

8. Criteria provided by agencies external to the Marine Corps. The Department of Defense, Department of the Navy, and JCS propose to the Marine Corps grades to be utilized in billets on their staffs.

9. Fleet Marine Force organization. Historically, Marine division commanders have been major generals; the principal division staff officers, colonels; the regimental commanders, colonels; and the battalion commanders, lieutenant colonels, and so forth. The tests of time, training, and combat have proven the propriety of these staffing criteria.

TASK ANALYSIS PROGRAM

We have initiated a program called task analysis, the fourth facet of manpower determination, in which we examine what each marine really does, why he does it, how he does it, and what skills he actually needs in order to do it. Because we are going to the man on the job in the field, we feel we are getting good answers to these questions rather than what analysts think the answers should be. The answers are producing improvements in classification, assignment, training, occupational field and grade structures, job requirements, and job validation.

At the end fiscal year 1971, 7 of 36 occupational fields had been analyzed. By end fiscal year 1972, 14 additional fields will be underway or completed. To date, 100 recommendations have been approved in HQMC resulting in 369 billets deleted or civilianized and nearly $2 million in cost savings or avoidance. The net effect is significantly improved utilization of our personnel.

POLICY

The final facet on which manpower requirements rest is policy—administrative policy which is outside the realm of those manpower processes already discussed. These policies may be internally generated. Frequently, however, they are imposed by higher authority.

Tour lengths or rotation policies, for example, are among the most significant policies, as changes in tour lengths have serious readiness implications. Any decline in morale, retention, or professional development resulting from changing tours would have an immediate, negative impact on readiness. Present tour length policies guarantee Fleet Marine Force tours for all hands on a regular basis. This results in a current level of personnel readiness and proficiency which would

seriously decline over time if certain unaccompanied tour lengths were extended.

Policies are subject to constant review and revalidation and are revised when circumstances so dictate. Present policies, however, provide a good balance among competing demands.

MANPOWER ALLOCATION

If everything went according to plan and plans were not changed, the manpower allocation would be accomplished in the early phases of the planning, programing and budgeting system. Unfortunately, however, projections made 2 to 3 years in advance are not always realized. Plans, policies, and commitments change. Consequently, available manpower must be allocated during the budget execution phase.

Many commands, because of their mission, location or size, must receive priority staffing. Then provision has to be made for the individual's category. Finally, all others are allocated manpower on a fair share basis at reduced manning levels. This allocation, then, is our final manpower target. Within limitations imposed by normal lead-times—90 days—for issuing orders, and subject to the timely attainment of recruiting and retention goals, that allocation is achieved.

Planning, programing and budgeting takes place in a 3-year spiral, supported by the five-faceted process of manpower requirements determination. Beginning with force level determinations based on strategy, roles, and missions, it includes consideration of grade and skill requirements, policy impacts, organization validation, and task analysis of each job. It is a careful, detailed, and rigorous effort. The result is a well-balanced, fiscally responsible, manpower budget request.

OBJECTIVES OF MANPOWER MANAGEMENT

Since manpower is a costly resource, and is becoming increasingly more so, it requires close, continual management. If I were permitted a guess based upon my experience over the years, I would say that no single function commands more concern throughout the Marine Corps—at every level—than that function broadly referred to as manpower management. Our Marines are, in fact as well as in principle, our most important asset and all of our efforts toward effective management proceed with four goals in mind. First, of course, is maximum readiness for combat; from this most important goal come the other three subsidiary goals: the most efficient procurement and training of men and women to meet our tough standards; the best possible use of these men and women once we have acquired and trained them; and, the maintenance of a philosophy best described by the phrase "taking care of our own."

In the area of procurement and training, we have made some changes in our outlook over the years—gradual changes, to be sure—and I will go into greater detail later—but I should mention now that our requirements are slowly changing and the reason they are changing is that the nature of conflict is shifting. That is, the type of conflict in which we think we have the greatest chance of being engaged requires the same

lean, tough, self-disciplined marine as we have always needed but the rules and the tools, and even the definition, of war are such today that the individual Marine has to be capable of sustained, independent action in a virtually infinite range of situations—situations which require the intelligent and discerning use of the deadly force at his disposal. In essence today's Marine simply has to be more intelligent than his predecessors.

TAKING CARE OF OUR OWN

Because he is intelligent and discerning—and more expensive to procure, train and keep—his individual well-being takes on a broader meaning than in the past. "Taking care of our own" has always applied to each Marine's responsibilities towards every other Marine in combat. That simple fact isn't changed. However, the philosophy has been expanded in recent years to include all aspects of the Marine's and his family's, well-being in both peace and war. We have opened direct, personal lines of communication between every Marine and our career planning branch at headquarters in order to assist each career-inclined Marine to reach his full professional potential in the Marine Corps. We have assumed central responsibility at our headquarters for providing assistance to Marines and their dependents in such areas as armed forces and veterans benefits. We have geographically spread the extra Marines that the Congress authorized for the family assistance portion of our zero draft request so that the family of any Marine serving overseas, or anywhere away from his family, can contact a nearby Marine whose duty it is to help out the absent Marine's family. These are a few examples of expanding the "taking care of our own" philosophy.

PRIMARY MOS/BILLET MOS MATCH

Acquiring, training, and taking care of our Marines isn't the whole answer to combat readiness. The third subsidiary management goal I mentioned had to do with making the most efficient use of our scarcest resource—manpower. Part of the solution to the "most efficient use" problem is seeing to it that Marines are serving in billets for which they are qualified. As of January 1, 1972, 86 percent of our officers and 94 percent of our enlisted Marines who were in specific billets were classified as having the skills required for that billet. When I say that the Marines "were classified" I mean that their occupational specialty designators matched those of the billets. This sort of matching gives a slightly less optimistic picture than the real world, though. For example, the billet MOS for a battalion adjutant is 0130, meaning administrative officer; however, an unrestricted officer can't hold a primary MOS of 0130 and, realistically, any young officer is expected to be able to hold the job of battalion or squadron adjutant. The same example applies to the billet of logistics officer on an organizational staff. This sort of MOS/billet mismatch, then, is not an example of putting a round peg in a square hole; but it does tend to lower the

percentage when we count the matched billets and MOS's. On the whole, we have been doing well in this area but it is one to which we devote considerable effort.

WOMEN MARINES AND CIVILIANIZATION

Another facet of matching the man to the job deals with examining the requirements of the job in the light of what kind of manpower, military or civilian, male or female, can be most economically used to get the job done. Women Marines, for example, may be assigned interchangeably with male Marines to satisfy the manning requirements for noncombat billets. Our strength goals are set at 300 women officers and at 1 percent of the total enlisted force for enlisted women or a total Women Marine force of 2,085 of this fiscal year and the next. In the area of civilian employment, we have consistently striven to substitute civilian manpower for military in those jobs where management continuity and experience can be better provided by civilians or where the civilian labor force can supply a specialized skill more economically than we can acquire it through our own military procurement and training processes.

Civilian substitution occurs largely as a result of day-to-day billet conversions recommended by local commanders. In fiscal year 1973 we plan to convert 54 billets in the publication and printing operations at Quantico, Va., and Camp Lejeune, N.C.; 30 more in our finance and accounting operations in Kansas City, Mo., and another 48 in our automated services center at Kansas City, Mo. A related program is the hiring of civilians for messman duty; we plan to hire 650 civilian messmen in fiscal year 1973. Finally, we are studying further civilization in the general areas of supply administration, food services, and accounting to determine if economical tradeoffs might be made. We are also studying alternatives to the use of Marines in commissaries, PX's, clubs and messes, and recreational activities.

CORRECTIONS FIELD

Occasionally, a Marine gets into trouble, sometimes serious trouble. When that happens, we have lost that Marine's productivity, as a practical matter, for about as long as he is in a disciplinary status. In an effort to reduce this manpower drain, we have expanded our corrections program. First, we strive to reduce the prisoner population by insisting that all cases be handled expeditiously and with discernment; the goal is to reduce processing time of individual cases and to reduce unwarranted confinement of minor offenders. Second, we strive to return a confined offender to normal duty better prepared to give the Marine Corps offense-free service. We have initiated a program for prisoners which includes counseling, training, productive work, and opportunities for self-improvement. This program is executed by a correctional staff trained and equipped to administer

an enlightened program. We have had encouraging results in this area as measured by a decrease in the confinement and recidivism rates. We hope, of course, for even further reductions.

OPERATING FORCES ALLOCATION

As I have mentioned, the three subsidiary goals of our manpower management efforts all work to allow us to meet our first and foremost objective: readiness for combat. We measure that readiness, in part, by the proportion of manpower devoted to the Operating Forces; the goal being that no less than 60 percent of our total force should be so employed. That goal isn't always attainable, particularly in time of personnel turbulence like the past few years wherein we drastically reduced our strength and made major redeployments of our Fleet Marine Forces. However, this year has been one of stabilization and we expect fiscal year 1973 to be one of increasing readiness for our operating Forces. This table shows what has happened and what we have programed for next year as far as manpower allocation is concerned.

(The table follows:)

MARINE CORPS PERSONNEL ALLOCATION

End fiscal year	Total military strength authorized (thousands)	Proportion of total strength (percent)			
		Operating forces	Supporting base	Training base [1]	Individuals [2]
1971	212	56.6	10.5	23.9	9.0
1972	198	62.2	10.8	20.5	6.5
1973	198	62.7	10.6	20.2	6.5

[1] Trainees and trainers.
[2] Transients, patients, and prisoners.

LEVEL OF READINESS

General Wheeler. The requested fiscal year 1973 end strength authorization of 198,000 marines will provide that level of readiness which has been and will continue to be the Marine Corps' stock in trade: The ability to respond, without delay, whenever so ordered, to the broad range of crisis situations which have occurred with regularity over the past 25 years.

COMBAT VERSUS NONCOMBAT FORCES

Chairman Ellender. I notice on page 30 of the justifications that at the end of fiscal year 1973 you expect to have 107,094 men assigned to combat forces and the balance of the total of 197,965 will be assigned to noncombat forces. This tabulation will be included in the record at this point.

(The tabulation follows:)

SCHEDULE OF COMBAT AND NONCOMBAT FORCES (END STRENGTHS)

Type of unit (based on fiscal guidance categories)	Fiscal years— 1971	1972	1973
1. Force mission (combat forces)	101,876	106,169	107,094
(a) Europe and related areas	2,142	2,105	2,105
(b) Western Pacific	25,834	22,949	22,949
(c) Other foreign countries	1,269	1,582	1,582
(d) United States, territories, and SEA	72,531	79,533	80,458
2. Other mission	1,952	2,137	2,101
(a) Europe and related areas	174	169	169
(b) Western Pacific	265	266	266
(c) Other foreign countries	20	20	20
(d) United States, territories, and SEA	1,493	1,682	1,646
3. Training	51,692	44,494	43,697
(a) Europe and related areas	2	2	2
(b) Western Pacific	0	0	0
(c) Other foreign countries	0	1	1
(d) United States, territories, and SEA	51,627	44,491	43,694
4. General support (other than training)	56,889	45,197	45,050
(a) Europe and related areas	938	936	934
(b) Western Pacific	1,857	2,607	2,606
(c) Other foreign countries	608	591	591
(d) United States, territories, and SEA	53,486	41,063	40,919
Total	212,346	197,997	197,942
Reimbursables	23	23	23
Total schedule of combat and noncombat forces	212,369	198,020	197,965

The "Force Mission" category consists of strategic, land, tactical air and Naval forces.

The "Other Mission" category consists of intelligence, communications, research and development, and support to other nations.

The "Training" category consists of specialized, recruit, professional and other military training.

The "General Support" category consists of base operating support, medical support, command, logistics, and individual support.

Chairman ELLENDER. General, how many of these 107,094 assigned to combat forces do you consider to be fighting men?

General WHEELER. Mr. Chairman, first of all, I would like to point out that we feel and have felt for many years that every marine is a fighting marine, all 198,000 of them whom we contemplate will be on duty——

Chairman ELLENDER. They are not all on the battlefront. What I am trying to do is to find out from each service, the number of men that are actually in combat units; that is, the number of fighting men. I realize that we must have supporting troops, but I have an idea that we will be surprised when we find out just how few fighting men we have.

When I read your statement, I noticed on page 19 you have decreased the number of officers to some extent.

General WHEELER. Right.

Chairman ELLENDER. The next question I was going to ask is, how many officers do you provide for each division? If you would answer those two questions I would appreciate it. Do you understand?

General WHEELER. I do indeed. I will be happy to answer them in detail on the record, if I may.

Chairman ELLENDER. Yes.

General WHEELER. First, I will address the officer numbers you requested. Marine fighting forces are divided into air/ground task organizations called Marine Amphibious Forces, or MAF's, each consisting of a ground combat division, an aircraft wing reinforcing combat support and combat service support units from our force troops, and a small headquarters element. Total marine officer strength in a typical, full strength MAF is about 3,000 with the division contributing about 1,000 and the wing about 1,500.

Next let me take up this matter of "combat" versus "support."

RATIO BETWEEN COMBAT AND SUPPORT TROOPS

Mr. Chairman, I understand thoroughly your concern in this matter. We have conducted a number of studies as to the ratio between combat and support, depending on what we are addressing. As you know, there are all kinds of definitions for what is combat and what is support. For example, one of our studies shows that with a broad interpretation including combat, combat support, and combat service support skills, almost 80 percent of our marines are classified with marine occupational specialty descriptions as marines who would in any given amphibious operation, air or ground, be present in the amphibious objectives area and therefore subject to being shot at and shooting and supporting shooting. That would be 79 percent of all our MOS's. On the other hand, if you look at it from a very narrow point of view where you take just marines who have infantry, artillery, armor, naval flight officers, pilots and a few others, then we get a combat percentage of 31 percent. But those 31 percent, of course, could not fight any battle, Mr. Chairman, without the other associated guys behind them.

Chairman ELLENDER. To support them.

General WHEELER. To support them, to pass the ammunition.

Chairman ELLENDER. That is the logistics.

General WHEELER. Yes, sir, and intelligence and administration and maintenance.

INTELLIGENCE OPERATIONS

Chairman ELLENDER. Do not misunderstand me. I realize the requirement for the supporting forces. It is the number of supporting forces in relation to the number of fighting men that concerns me.

Intelligence is a good example. After a detailed review this committee determined that there was an excessive number of military and civilian personnel assigned to intelligence activities, and that the total requested for these activities was also excessive, and substantial reductions were recommended.

I realize that it is not an easy task to divide your total force between fighting men and supporting men. However, I wish you would give this matter some thought and furnish a statement for the record on the problem.

General WHEELER. I will be glad to do that, Mr. Chairman.
(The information follows:)

Dividing a military service into only two categories, combat and support, is a simplistic approach to the categorization of military manpower. It should be viewed with caution as it carries with it the implication that one is desirable and the other is not. The approach is analogous to analyzing a professional football team by placing the ball-carriers in one group and the remainder of the team in another.

Dividing military manpower into the combat and support categories also fails to reflect the changing character of warfare. Advanced technology has led to greatly increased firepower but a requirement for more personnel to perform in a support role. The lesser manpower involved in close combat and overall increased firepower has resulted in significant improvements in combat power but at the same time has decreased the number in the combat category and increased the number in support.

The Marine Corps views itself as all combat since every Marine is trained to be a rifleman first, and some are also trained in an additional specialty. The value of this philosophy was proven during World War II at Guadalcanal, during the Korean conflict at the Chosin Reservoir and daily in Vietnam. In this latter case office clerks, cooks, and mechanics regularly occupied defensive positions at night and performed as riflemen in a war which had no front lines. This concept and some alternative methodologies for defining combat are set forth in the following table:

ALTERNATIVE DEFINITIONS OF COMBAT

Methodology	Included	Rationale	Combat percentage in Marine Corps
1. Marine Corps view	All marines	Every marine a rifleman first	100
2. Skill field—broad	Combat, combat support, and combat service support skills.	Deploy to combat area, likely to engage enemy/sustain casualties in amphibious operations.	79
3. Major combative units	Divisions, wings, force troops units, fleet escort ships, carriers, assault ships, support ships, Navy fleet staffs.	Major units whose mission is to engage the enemy or his weapons systems, and barracks which have a base defense mission.	[1] 61
4. Fiscal guidance categories—broad interpretation and modified to reflect Marine unique support of other services agencies.	Major mission forces as defined by Assistant Secretary of Defense, Systems Analysis, plus marine barracks and nonstudents in combat crew readiness training groups.	Excludes all program elements included in Assistant Secretary of Defense, Systems Analysis, definition of general support except marine barracks' base defense mission and continental air defense mission of the nonstudents in combat crew training groups.	60

[1] 77 percent of authorized billets.

As can be seen from the table, the percentage of strength in combat depends entirely on the definition which allows a very broad range.

REDUCTION IN INTELLIGENCE ACTIVITIES

Chairman ELLENDER. Did the reduction in intelligence activities recommended by this comittee affect the Marine Corps?

General WHEELER. It did affect us, Mr. Chairman.

Chairman. ELLENDER. To what extent?

General WHEELER. The cut was effective in our very, very small G–2 section of the Headquarters, Marine Corps, which consisted of no more than about 30 officers and men. Of that 30——

Chairman ELLENDER. Thirty officers and men in intelligence?

General WHEELER. In G–2.

Chairman ELLENDER. How many altogether?

General WHEELER. About 30, sir.

Chairman ELLENDER. I saw an entire force of 2,000——

General WHEELER. That is the intelligence function at the seat of the Government, in our Headquarters, Marine Corps. We have a very small section. As I say, they were cut three officers and two enlisted as a matter of fact.

Chaiman ELLENDER. You have intelligence in the field.

General WHEELER. Yes, sir; we do have marines assigned to intelligence. We have the figures here.

Chairman ELLENDER. Do you charge them to intelligence?

General WHEELER. Yes, sir; we carry them in what we call program No. 3, intelligence and communications in which we have approximately 2,300 in 1973.

(Discussion off the record.)

ASSIGNMENTS TO EMBASSIES

Senator YOUNG. You have marines assigned to practically every embassy in the world. Do they participate in intelligence activities?

General WHEELER. No, sir. Those are strictly security guards, Senator Young. Each embassy has a small group of marines who are there primarily for the interior security of the embassy.

Senator YOUNG. This is a different type duty from that of the Navy and the Army attachés?

General WHEELER. Yes, sir. We do have a few, a handful of marines, 22 who are attachés or assistant attachés.

As I say, that is just a handful. The group that you refer to of about a thousand marines that are assigned all over the world in embassies primarily for physical security as opposed to intelligence.

EMBASSY GUARDS

Chairman ELLENDER. What is the number of officers and enlisted personnel utilized in guarding our embassies and other locations abroad?

General WHEELER. There are 21 officers and 1,088 enlisted marines providing security for the State Department in 89 foreign countries.

Chairman ELLENDER. Are these included in your combat or force mission personnel count?

General WHEELER. To be precise, no. These marines are counted as general support forces in the Defense Department's mode of reckoning; that is, fiscal guidance categories. Since we have historically provided security for U.S. embassies abroad, we naturally consider such duty to be a Marine Corps mission rather than a general support function; as such, we consider these marines to be part of the operating forces which we've historically addressed in our testimony before the Congress.

INTELLIGENCE OPERATIONS

Admiral MOORE. Mr. Chairman, I believe the record will indicate that you did not direct any reductions in intelligence in the Marine Corps military personnel account. They have taken some reductions,

however, the reductions specifically addressed in the military personnel account were in the public affairs area.

Chairman ELLENDER. Off the record.

(Discussion off the record.)

General WHEELER. The people that we have, Mr. Chairman, engaged in the intelligence function are very modest indeed.

Chairman ELLENDER. You did reduce your intelligence?

General WHEELER. We did, we reduced the G–2 section in Headquarters, Marine Corps.

Chairman ELLENDER. You made it in accord with what we intended you to do. But apparently in the other services it was not done that way.

General WHEELER. Yes, sir.

Chaiman ELLENDER. How many do you have left now? How many did you cut out altogether in intelligence? What number did you have altogether before you were ordered to cut?

General WHEELER. In 1964 we had 17 officers and 10 enlisted for a total of 27 in the G–2 section.

Senator YOUNG. That is here in Washington, in the Headquarters, Marine Corps. What about on a worldwide basis?

General WHEELER. Worldwide, in 1964 we had 2,100 engaged in the program for intelligence and communications functions. Now, in 1973 we plan here in Washington to cut to a total of 23, 15 officers and eight enlisted, which is a very modest number for intelligence at headquarters.

In program 3, intelligence and communications——

Chairman ELLENDER. Worldwide?

General WHEELER. Worldwide. 2,300.

Chairman ELLENDER. You increased it.

General WHEELER. Since 1964, Mr. Chairman.

LOCATION OF PERSONNEL

Chairman ELLENDER. Where are these 2,300 personnel located?

General WHEELER. They are located all over the world. Here to give you some idea, there are some in the Defense Nuclear Agency, there are some in the National Military Command Center, 23 to be exact. There is one in the Navy Communications Command and in D.C.A. Telecommunications there are 47. The balance are in the consolidated defense intelligence program. As I say, they are worldwide, Mr. Chairman, in relatively small numbers.

Chairman ELLENDER. I am not complaining about battlefield intelligence, but the idea of having so many all over the world where you are not even fighting is what I am complaining about. As I have said, the services have increased that until the cost is simply tremendous. This continues to go on all over the world on a colossal scale, and I wonder why.

General WHEELER. Mr. Chairman, it takes many, many years actually to train these men in this function. As you know, we can't make instant intelligence experts out of them. Many of them are trained to perform as cryptologists in our radio battalions, and that is a function I did not mention in the 2,300. They are the men who are trained to understand various languages. They listen to and translate them.

Chairman ELLENDER. This is a battlefield function?

General WHEELER. Yes, sir.

Chairman ELLENDER. I am not complaining about that. I think that is absolutely necessary. But to continue such a large force during peacetime is what I can't understand. I can't understand why you should need so many.

If you can get me the information that we have asked for, being a little more specific than you have here, adding it to your statement, it will be printed at this point in the record.

General WHEELER. Yes, sir.

(The information follows:)

The Marine Corps manpower in Program III, Intelligence and Communications, includes that required to support internal requirements and that portion of other DOD agency manpower requirements which the Marine Corps fills.

The Marine Intelligence requirements, a part of the Consolidated Defense Intelligence Program, consist of two radio battalions, seven special security communications teams and 180 enlisted trainee spaces. The radio battalions provide tactical special intelligence support to the Fleet Marine Forces and the communications teams are assigned to support each division and wing as well as to support Headquarters Marine Corps.

Fiscal year 1973 resources to support other DOD agency manpower requirements include the Marine Corps share of the remainder of the Consolidated Defense Intelligence Program, communications personnel at the Defense Communications Agency and the Navy Communications Command; as well as instructors at the Defense Nuclear Agency schools and the Marine share of the operations of the National Military Command Center. Manpower authorizations for the remaining activities in the Consolidated Defense Intelligence Program are: Marine Support Battalion, which supports the Navy's cryptologic activities, 651; classified collection operations, 2; Atlantic Command electronics intelligence, 3; Navy Fleet Intelligence Centers, 40; Navy Scientific and Technical Intelligence Center, 1; Naval Investigative Service, 5; National Security Agency, 95; Defense Intelligence Agency, 23; the Defense Attache System, 22; and the intelligence related function of physical security for the National Security Agency, 378.

Program III, Intelligence and Communications, is summarized in the table below:

PROGRAM III

	Fiscal years—			
	1969	1971	1972	1973
Total intelligence	2,412	2,270	2,266	2,264
Marine intelligence requirements	1,073	1,046	1,046	1,046
Other service/agency intelligence requirements	912	846	842	840
Marine Barracks, Fort Meade (intelligence related security function)	427	378	378	378
Total nonintelligence	530	80	82	77
Defense Communications Agency	45	47	47	47
National Military Command Center [1]	95	17	22	23
Navy Communications Command	6	1	1	1
Defense Nuclear Agency	[2] 384	15	12	6
Total program III	2,942	2,350	2,348	2,341

[1] Small increases in fiscal years 1972 and 1973 are related to implementation of the Worldwide Military Command and Control System.

[2] Includes Marine barracks at Clarksville and Lake Meade.

REVIEW/UPDATE OF FISCAL YEAR 1972

General WHEELER. Turning now to the fiscal year 1972 column of the fiscal year 1973 budget, we see significant changes have taken place which have reduced manpower costs.

The fiscal year 1972 President's budget requested funds for an end-year strength of 206,000 marines. However, early in this fiscal

year, joint management actions were taken to more nearly aline fiscal year 1972 end strength and fiscal year 1973 anticipated strength, thereby permitting an orderly phasedown and minimizing turbulence. This action reduced the pay raise supplemental request by over $27 million.

The fiscal year 1972 column of the President's fiscal year 1973 budget now requests $1.48 billion for 198,000 marines at end year. This strength is adequate to meet our commitments, engenders more stable manpower conditions earlier, and greatly decreases manpower costs.

The fiscal year 1973 request for $1.54 billion provides for a continuation at the 198,000 strength level. Over 90 percent of the dollars requested are for officer and enlisted pay and allowances. The number of officers and their cost has gone down from fiscal year 1972 reflecting the positive action the Marine Corps has been taking since early in 1969 to reduce its officer strength and grade structure. The enlisted cost, on the other hand, has gone up well beyond what the small increase in numbers would require. This is a result of the recently enacted entry level pay raise and occurs despite reductions in the senior enlisted grades.

Chairman ELLENDER. You can well understand, General, that our objective is to find ways by which we can reduce the budget without in any manner affecting our national security. We have a situation now where it requires about 56 percent of our defense budget for manpower related costs in contrast to about 42 percent of the budget only 7 or 8 years ago. That does not leave very much for operations, procurement, and R. & D. It is rather difficult to make cuts where so small a percentage of the whole amount is for these items. That is our problem. That is why I believe that something ought to be done to reduce manpower and thus reduce the budget. The record also shows that, notwithstanding the reduction in manpower, the cost is about the same because of the increase in pay.

PERSONNEL AND ASSOCIATED COSTS

Senator YOUNG. General Wheeler, I note of the $1.54 billion, 90 percent is for the pay of officers and enlisted men. For what is the other 10 percent?

General WHEELER. The other 10 percent is for PCS, subsistence and the other budget activities under MPMC. By far the biggest bulk of the total of all Marine Corps appropriations, as you have pointed out, Senator, is for military personnel costs and associated costs.

Chairman ELLENDER. That is a field in which, in order to make deductions, one will have to reduce manpower, if that is at all possible.

General WHEELER. This, Senator, is what we have been trying to do.

MANPOWER PLAN OBJECTIVES

The fiscal year 1973 manpower plan embodied in the appropriations request has as its objectives:

a. Improvement in the overall readiness and reassumption of the traditional peacetime force in readiness role at a slightly higher force level.

b. Continued improvement in the professionalism of marines while at the same time improving their general welfare.

c. Continued reduction in the number of officers and their grade structure.

d. Continued reduction of the enlisted grade structure to reflect manned unit requirements and new pay scales.

e. The elimination of management actions to reduce strength which also encourage or increase personnel turbulence.

We believe the word Marine is synonymous with readiness. The requested strength of 198,000 for fiscal year 1973 will provide us the capability to fulfill our legal and historical role, that of providing Marine forces trained, organized, and equipped as an air/ground team and as members of balanced Navy/Marine amphibious task forces capable of rapid deployment for the projection ashore and selective application of U.S. combat power to meet the requirements of a broad range of crises.

OFFICER MATTERS

I should now like to discuss some of the details pertaining to our officer plan.

Our officer profile has undergone considerable change as the force expanded to meet wartime requirements and then contracted to reflect the decreased Vietnam role of the Marine Corps. The below table indicates the extent of the changes to the grade structure:

(The table follows:)

OFFICER GRADE STRUCTURE

END STRENGHTS

Grades	Fiscal year 1965	Fiscal year 1969	Fiscal year 1973	Difference fiscal years 1969–73
Generals:				
Chargeable	60	75	71	−4
Nonchargeable		3	1	−2
Colonels	593	760	639	−121
Lieutenant colonels	1,408	2,094	1,521	−573
Majors	2,498	4,010	2,991	−1,019
Captains	4,034	5,545	5,330	−215
Lieutenants	7,080	11,878	6,950	−4,928
Warrant officers	1,585	1,333	1,630	+297
Total	17,258	25,698	19,133	−6,565

OFFICER FORCE

Reduction

General Wheeler. The 24.8-percent decrease among field grade officers and above from end fiscal year 1969 to 1973 is about equal to the overall officer force reduction of 25.5 percent during the same period.

I would like to point out that the 24.8-percent decrease among field grade officers and above from the end of fiscal year 1969 to 1973 is almost equal to the overall officer reduction of 25.5 percent during the same period.

NONCHARGEABLE OFFICERS

Chairman ELLENDER. I notice you had, in 1965, 60 chargeable generals and in 1969 you had 75 chargeable generals and three nonchargeable. What do you mean by "nonchargeable"?

General WHEELER. Nonchargeable means that they are working outside the Department of Defense, for CIA, for example, as General Cushman was, before he became Commandant. Or they are nonchargeable if they are retired general officers and called back for some job like assistant counsel for DOD where we have a brigadier general. They are not chargeable under the law for promotion and general officer numbers.

Chairman ELLENDER. They are paid by you?

General WHEELER. Sometimes they are; sometimes they are not. Mr. Chairman. Sometimes they are reimbursable, such as the CIA billet where the CIA or other agency would pay for them.

COLONEL STRENGTH

Chairman ELLENDER. I note that your plan calls for 639 colonels based on the planned end strength of 198,000.

General WHEELER. That is correct, sir.

Chairman ELLENDER. It is indicated that is a reduction of 121 below the previous number of 760. What was your total strength when you had 760 colonels?

General WHEELER. That was at the end of fiscal year 1969, when our total strength was 301,000.

WARRANT OFFICERS

Chairman ELLENDER. You indicate a reduction in all officers, colonels, lieutenant colonels, majors, captains, lieutenants, and then when it comes to warrant officers you have an increase.

General WHEELER. Yes, sir.

Chairman ELLENDER. What is their function, generally?

General WHEELER. The warrant officers are administrators, technicians, maintenance types, air control, things of that nature, highly technical operations.

The reason there is a plus there is this, Mr. Chairman: We had a number of officers who were temporarily commissioned during the war from enlisted ranks; most of them were NCO's. In the early part of the war, we temporarily commissioned 5,600. In 1969, 1970, and 1971, we reverted many of them back to their enlisted ranks, but we did retain the best ones as officers or warrant officers. That is the reason for the increase.

Chairman ELLENDER. You mean they changed from lieutenant to warrant officer?

General WHEELER. Yes, sir.

Chairman ELLENDER. What is the difference in pay between the lieutenants and the warrant officers?

General WHEELER. They are very similar. A warrant officer with considerable longevity draws more money than a lieutenant or even a captain.

PROPORTIONATE REDUCTIONS

Chairman ELLENDER. Would you say, then, that you reduced the various grades in proportion to your cut in the number of troops?

General WHEELER. To the overall reduction and in proportion to the cuts in the overall strength; yes, sir. For example, Mr. Chairman, the proportion of colonels, of the total officer force in 1959 was 3.4 percent; 3.4 percent of all the officers in 1959 were colonels. But in 1973, 3.3 percent of them will be colonels, even lower than 1959.

The same percentages, Mr. Chairman, obtain in the case of lieutenant colonels where in fiscal year 1959 some 8.4 percent of all the officers were lieutenant colonels, but in 1973 we plan only 7.9 percent of the officers will be lieutenant colonels.

GENERALS: COMMAND

Chairman ELLENDER. How many generals in each of your divisions?

General WHEELER. Each Marine division has two generals, a major general and a brigadier general. Each Marine aircraft wing has two, a major general and a brigadier general.

Chairman ELLENDER. What is their function?

General WHEELER. They command the wing or the division, sir.

Chairman ELLENDER. From where?

General WHEELER. Right with the division, sir.

Chairman ELLENDER. In the field?

General WHEELER. In the field; wherever that division may be. The same with a wing.

SENIOR-GRADE OFFICER REDUCTIONS

Chairman ELLENDER. I presume most of your pilots are officers.

General WHEELER. Yes, sir; they are.

Chairman ELLENDER. That is why you have so many lieutenants and captains?

General WHEELER. That is correct; yes, sir. About one-third of them are naval aviators or naval flight officers.

Chairman ELLENDER. All right.

General WHEELER. The reduction in senior grades has been such that the proportion of the total officer force in the grades of colonel and lieutenant colonel at the end of fiscal year 1972 will be below that in the pre-Vietnam years, 1959–65.

The end fiscal year 1973 officer strength of 19,133 represents 9.7 percent of the total Marine Corps strength. This is slightly above the fiscal year 1965 officer proportion of 9.1 percent. Several factors have contributed to this increase, such as the elimination of Marine aviation cadets, but the major portion of the change can be illustrated by looking at occupational field changes which have occurred.

OCCUPATIONAL FIELD CHANGES

While the grade structure has remained similar to that which existed in fiscal year 1965, the mix of officers by occupational field has shown some significant change. Chief among the changes are increased requirements for pilots, naval flight officers, lawyers and officers in data systems and other management and administrative fields. These changes have significantly increased our combat support capability and the overall readiness of the Marine Corps.

OFFICER ACCESSIONS

The reductions effected in officer strength during fiscal year 1973 will be accomplished largely through constraining accessions below that required to sustain the career force. A majority of the 2,100 accessions will be obtained from colleges, but there will be, as always a number of commissions reserved for outstanding enlisted marines.

Increasing women officer accessions and intensifying efforts to recruit minority group members should assist us in meeting our accession goals from colleges. The minority group effort will include full-time representation on five predominantly black campuses.

OFFICER PROMOTIONS

Officer promotions were sharply curtailed during fiscal years 1970 and 1971 in order to achieve the required grade and end strength reductions. The slowdown in promotions which has occurred has allowed reassumption of time-in-grade points similar to those which existed for promotion prior to the buildup for Vietnam.

OFFICER EDUCATION

The increased technological demands, as well as the necessity to access and retain high quality officers, requires an increased emphasis on education. Intermediate and high level schooling is continued at a slightly increased pace in order to allow officers to attend who were precluded from doing so by their service in Vietnam.

Our college degree program provides highly qualified career officers an opportunity to complete their undergraduate studies. Postbaccalaureate training in the advanced degree and special education programs provide officers training in technological demanding areas for which the Marine Corps has specific requirements.

These programs also serve as accession incentives, as well as career enhancement and retention means. These programs are vital to attainment of the all-volunteer force and are a sizable part of our funds requested to achieve that goal.

ENLISTED MATTERS

Turning now to the enlisted structure, the below tables show the end strengths from 1969 to 1973 and summarize the change that occur during the period.

(The table follows:)

ENLISTED GRADE STRUCTURE

END STRENGTH

[In thousands]

	Fiscal year—				
	1969	1970	1971	1972	1973
E–4 to E–9 (top 6)	116.2	103.5	88.1	82.1	82.1
E–1 to E–3	167.9	131.3	102.5	96.1	96.7
Total	284.1	234.8	190.6	178.2	178.8

STRENGTH CHANGES

[In thousands]

	Begin fiscal year 1970—end fiscal year 1971	Begin fiscal year 1972—end fiscal year 1973
E–4 to E–9 (top 6)	−28.1	−6.0
E–1 to E–3	−65.4	−5.8
Total	−93.5	−11.8
Cumulative total	−93.5	−105.3

PAY GRADES E–1, E–2, AND E–3

General WHEELER. The above tables indicate that a larger part of the reductions in fiscal years 1970 and 1971 occurred in the bottom three pay grades, pay grades E–1, 2, and 3.

Chairman ELLENDER. How much has the pay of an E–1 increased in the last 6 or 7 years? From what to what?

General WHEELER. It was about $80 6 or 8 years ago.

Chairman ELLENDER. And now?

General WHEELER. Now it is $288.

Chairman ELLENDER. Proceed.

PAY GRADE E–4 THROUGH E–9

General WHEELER. The reduction in the top six pay grades, E–4 through E–9, was less during this period 1970–71 due to the reverse to these grades of over 3,200 temporary officers commissioned to meet wartime requirements.

In contrast to this, the greater portion and proportion of the reduction for fiscal year 1972 and 1973 occur in top six pay grades. In fiscal year 1972, our most populated enlisted grade is lance corporal, E–3.

In fiscal year 1973, private first class, E–2, becomes the most populated grade. Thus driving down the base of our manpower pyramid from lance corporal to private first class represents significant cost savings both now and in future years.

PROMOTIONS

Promotions in the career force will return to near pre-Vietnam levels in fiscal year 1973. As previously discussed, times in grade for entry level marines will be lengthened in accordance with our intent to establish a more deliberate promotion flow.

ACCESSIONS

Enlisted male accessions for fiscal year 1973 will be 53,600 with female accessions of 1,210. All will be volunteers, as will the entire Marine Corps as the last of the February 1970 draftees are discharged this month.

Obtaining nearly 55,000 high quality accessions in the relatively low draft pressure environment of fiscal year 1973 will be a considerable challenge to our recruiting service. However, the additional funds requested in the zero draft budget will materially assist us in reaching this objective.

QUALITY

As we approach a peacetime personnel posture, the quality of the enlisted force takes on increased importance. In a small sized Marine Corps, nonrated marines must be prepared to assume noncommissioned officer responsibilities, and noncommissioned officers must be prepared to serve as temporary officers of marines in the event a national emergency again demands a rapid expansion of the Marine Corps.

The need for such an expansion capability, the physically and psychologically demanding nature of Marine Corps service, the increasing sophistication of the Marine Corps weapons systems and administrative/management procedures, and our reputation as an elite force in readiness dictate that the Marine Corps attract the highest quality applicants for enlistment.

In an effort to procure only quality enlistments, the Marine Corps at the beginning of fiscal year 1972 raised its standards for applicants. The Marine Corps took the following actions:

(*a*) The enlistment of all 17-year-old applicants was limited to those who complete high school or an equivalent trade school, or score 50 or better on the Armed Forces qualification test.

(*b*) Recruiters were given a goal that required 65 percent of their new recruits to be high school graduates. Through December, 56 percent of our recruits have been high school graduates. Although it is short of the Marine Corps goal, it is over 3 percent higher than that achieved at this point last fiscal year.

ENTRY LEVEL TRAINING

To insure that these new recruits receive the finest training, the Marine Corps has revised its entry level training program. In the past, our program was a 12-week course, including recruit training and individual combat and skill qualification training.

The new program consolidates recruit and individual training into a single course of 11 weeks' duration. While 1 week of training time is saved as a result of the consolidated program, the number of instructors required for the new program is also less.

Reduction in the training time has not been at the expense of the recruit. Although manpower and fiscal savings were motivators of the change to our recruit training program, improvement in the basic marine rifleman was also a factor. This instruction gain is realized in the revision. With increased attention by the drill instructors, the marginal recruit is afforded more time and assistance to complete his training.

The revised program has been in operation on the west coast since November 1, 1971, and plans are to have it implemented on the east coast by end of fiscal year 1972.

RETENTION

Once we have recruited the new marine and trained him in his basic skills, a major concern becomes the retention of the number of personnel required to sustain the career force. Retention of marines is improving. During the first 5 months of this fiscal year our reenlistment rate was 19.7 percent, as compared to fiscal year 1971's 17.7 percent and fiscal year 1970's 13.4 percent. However, retention is a particular problem in the so-called hard skills; that is, those skills requiring a long leadtime for training, such as electronic technicians and air controllers. Adequate retention in the soft skills, those skills requiring relatively short periods of qualification training, has been less difficult.

The Marine Corps has taken steps to alleviate this retention imbalance by establishing a lateral movement program whereby a marine possessing a skill which is overpopulated, and who has the requisite qualifications, may be retrained in one of the underpopulated or short hard skills.

Also, to further alleviate shortages in certain skills, we have made a concerted effort to encourage reenlistments from former marines who possess skills in the underpopulated hard skill areas. We have liberalized policies affecting their reenlistment and revised administrative procedures to give recruiters more latitude in reenlisting these former marines. Since these changes were effected, reenlistments of former marines has doubled.

RETENTION OF ENLISTED PERSONNEL

Chairman ELLENDER. Please provide the committee with a tabulation indicating the retention rate among enlisted personnel.

General WHEELER. Retention rates for fiscal years 1969–72 are as follows:

	1st term	Career	Total
Fiscal year:			
1969	7.4	74.5	14.3
1970	7.0	79.8	13.4
1971	7.9	81.8	17.7
1972 (1st half)	9.5	81.0	19.4

VARIABLE REENLISTMENT BONUS/PROFICIENCY PAY

General WHEELER. A very important facet of our overall enlisted retention program in the short skills is the variable reenlistment bonus program and the proficiency pay program. The variable reenlistment bonus is paid to reenlistees serving in skills that do not have sufficient career personnel and is intended to provide incentive for marines to reenlist in these skills.

Proficiency pay is also designed to retain marines in short skill areas, or to encourage marines to volunteer for specific duty assign-

ments. A new phase of the proficiency pay program is the superior performance pay which was initiated in fiscal year 1972. This is a competitive program designed to pay $30 per month to marines in pay grades E–3 through E–7 who are not receiving any other form of proficiency pay and who distinguish themselves as superior performers. The top 10 percent of eligible marines in a unit may be awarded this pay. These men receive the ward for superior performance based on self-education efforts, marksmanship, physical readiness, essential subjects training, and their commanding officer's evaluations.

For fiscal year 1973 we are requesting $23.4 million for the variable reenlistment bonus and proficiency pay programs, up from $2.15 million in fiscal year 1972. We need your continued support of these programs to help us maintain acceptable reenlistment rates in these short skill areas.

CAREER QUALITY CONTROL

While exerting special effort to retain the numbers of marines we need in the skills we need, we also concentrate on retaining only those who measure up to the standards of marine professionalism. A first term marine requesting reenlistment at the end of his initial enlistment must meet physical and mental standards as well as demonstrate potential for further promotion in the noncommissioned officer grades.

While carefully measuring the quality of those first term marines whom we allow to enter our career force, we also carefully monitor the quality of our career force.

Reenlistment requests of all career marines are carefully scrutinized. Only the best are reenlisted. Reenlistments of marines whose reenlistment request would carry them over the 20-year point in total service must be approved by the Commandant. In addition, career marines whose recent service has been below standard are officially notified by Headquarters Marine Corps that they will not be permitted to reenlist unless they show improvement. The Marine Corps career staff noncommissioned officer promotion system also plays a significant role in quality control. All promotions to, and within, staff noncommissioned officer grades are based on results of selection boards convened at headquarters Marine Corps. However, each marine's commanding officer must concur in the promotion and can withhold it if facts warrant this action. Thus, not only a marine's past record, but his up-to-the-minute performance of duty are evaluated in determining who will be promoted.

EDUCATION

Associated with the emphasis on quality in the career force, increased emphasis is being placed on improved professionalism of career enlisted marines. To this end, the Commandant has established a Marine Corps staff noncommissioned officer professional education program. The program began formally in September 1971 with the commencement of regular classes of the newly established Marine Corps Staff Noncommissioned Officer Academy located at Quantico. The 6-week course, with a capacity of 192 students per class, is designed to provide the Marine staff noncommissioned officer, regardless of duty assignment or occupational specialty, with the professional education needed to best meet his vital responsibilities within the command and leadership structure of today's corps.

Similar academies are now in the process of being organized at other posts and stations as is an extension course.

This three-pronged program—the Marine Corps Staff Noncommissioned Officer Academy at Quantico—command-sponsored academies—and the Marine Corps Staff Noncommissioned Officer Academy extension course—will provide young Marine staff noncommissioned officers with increased professional education opportunities heretofore only available to officers.

In addition to providing professional training for our career force, we have requested funds to continue our successful associate degree program for enlisted marines in fiscal year 1973. This program provides up to 18 months' full-time junior college study for enlisted marines. In addition, we are requesting funds to support the continuation of the degree completion program for staff noncommissioned officers. This program was initiated in fiscal year 1972 to enable qualified staff noncommissioner officers up to 21 months of full-time study culminating in the award of a bachelor's degree.

Both of these programs are viewed as important retention aids in that they can attract some of our most promising young marines to a career. Also, these program are an important recruiting incentive in that they offer an opportunity to qualified applicants to further their education while in the military. The programs will also greatly assist us in meeting officer accession requirements in future years.

AREAS OF CONGRESSIONAL CONCERN

Congress has expressed concern during the past year in several areas; among them the size of headquarters staff, the number of personnel assigned to public affairs and intelligence activities, and, finally, the proliferation of generals and colonels. I will briefly discuss each in turn.

HEADQUARTERS STAFFS

In response to congressional concern over the size of headquarters staff and due to our own decreased requirements, the Marine Corps has taken action to reduce the manpower employed in headquarters activities. Near our wartime peak at the end of fiscal year 1969, 1,927 marines were serving at Headquarters, Marine Corps and on various Navy and unified command staffs. In fiscal year 1973, we are requesting an end strength authorization of 1,446 or a reduction of 25 percent from the wartime high.

Chairman ELLENDER. How does that affect your establishment? You are taking a cut in the number of officers at headquarters, but was that partially due to the fact that you are reducing to 198,000?

General WHEELER. That was part of it, Mr. Chairman. Also, it is our intention to get down to an irreducible minimum in all of our functions, including intelligence, heaquarters, and public affairs, to get down to the point where we can still adequately do the job with a minimum of personnel because our intent is the same as yours, Mr. Chairman, and that is to get the maximum number of marines in the operating forces.

Now, I might point out that in making these reductions in the headquarters; it is in the face of, Mr. Chairman, almost daily increase in

functions that the headquarters is required to carry out. For example, in the area of drug abuse, we are investing more of our people in headquarters and throughout the Marine Corps in keeping track of drug abuse problems; in the area of equal opportunity, another burgeoning area that requires headquarters concern. All of these require more time on the part of the headquarters people.

I merely point out that in spite of increasing functions being laid on us we are decreasing numbers.

Chairman ELLENDER. Has there been any change in definition of headquarters personnel?

General WHEELER. There has been no change in the number or designation of activities counted in the headquarters exhibit on pages 3–79 and 3–80. However, some marines previously counted under headquarters activities are now counted under public affairs in compliance with the Defense Department's manner of aggregating manpower.

DRUG ABUSE PROGRAM

Chairman ELLENDER. Last year I thought that the Marine Corps made the best record in dealing with drug abuse. Has that condition improved, if any, since your last appearance?

General WHEELER. Well, sir, I don't know if the Marine Corps has the best record. I am not familiar comparatively with other services' statistics. Statistics in the drug abuse field are still not clear, but, to answer your question, the best measurement of drug abuse problems in the Marine Corps today is the drug abuse exemption program which was instituted back in July as a part of the overall DOD program. Under this program the young marine who thinks he is drug addicted or having problems with drugs can report to a designated drug abuse officer, "I am on the stuff and I need help." Under this exemption program, he is exempted from any kind of disciplinary action that would stem from his drug abuse.

Chairman ELLENDER. He is then willing to be treated?

General WHEELER. He is indeed, and he is treated.

Chairman ELLENDER. There are no charges made against him?

General WHEELER. That is correct.

Chairman ELLENDER. Somebody testified last year that a second or third offender was dropped from the Marine Corps. Is that the case now, or have you changed that?

General WHEELER. If the young man is a backslider, Mr. Chairman—he gets only one chance—on the second chance, he is out.

EXEMPTION PROGRAM, ADDICTION, AND TREATMENT

At any rate, to give you an idea statistically of how we stand today, our drug abuse program which commenced on July 17 has accumulated so far some 3,774 exemptions. This is as of a week ago.

Now, of those 3,774, however, only 313 have been diagnosed by proper authority as really drug addicted, dependent on drugs beyond the level where the command itself can't handle it. These 313 have been sent off to one of two Navy drug rehabilitation centers on the west coast and the east coast.

Chairman ELLENDER. Those will not be permitted to come back into the Corps?

General WHEELER. They can; yes, sir, and they have, one or two of them have been treated and have returned to duty. But by far the majority of them are discharged ultimately and directed toward the VA activity nearest their home for further treatment.

Chairman ELLENDER. When they voluntarily admit drug use, and subject themselves to treatment, what kind of discharge do you give them?

General WHEELER. The discharge must be a general discharge or an honorable discharge if they are discharged for addiction. Nothing less than a general discharge.

Chairman ELLENDER. The ones who are second or third offenders, what type of discharge they get?

General WHEELER. That is at the discretion of the commanding officer, Mr. Chairman.

Chairman ELLENDER. We receive letters regarding the unfairness of being dishonorably discharged.

DRUG-DEPENDENCY

Senator ALLOTT. I am not sure I understand the situation. I would like to explore it with a couple of questions. If a man comes in under an exemption and is not taken back to duty, you said he gets a general discharge?

General WHEELER. At least.

Senator ALLOTT. Or an honorable discharge?

General WHEELER. That is correct.

Senator ALLOTT. What is a general discharge? That is not less than honorable?

General WHEELER. That is one degree less than an honorable discharge; yes, sir, although the penalties are practically none. I think that the only significant difference is that he is not allowed to wear his uniform home.

Senator ALLOTT. It is not a dishonorable discharge?

General WHEELER. No, sir, it is not.

Senator ALLOTT. It is not a section 8?

General WHEELER. That is correct. All of the rights and privileges of a veteran obtain in this case.

Senator ALLOTT. Under a general discharge?

General WHEELER. Under a general discharge.

Senator ALLOTT. If you put these personnel in a hospital, and they do not seem to be making progress, do you discharge them before you refer them to the veterans facility nearest their home?

General WHEELER. Usually, Senator, the period of time that these young men are treated in these rehabilitation centers is 90 days. But, in some cases where it is determined by the authorities there that a longer period of time would help the young man, they keep him there a longer period of time. So that in most cases they are reasonably sure that the service has done everything it can to rehabilitate the young man.

Senator ALLOTT. They would not be separated until that time?

General WHEELER. That is correct. When he is separated finally, he is pointed in the direction of a VA hospital nearest his home of record.

Senator ALLOTT. I want to carry this one final step. You take one of these boys and put him in a hospital, but he is a backslider. You still have him on your roster; he is still a member of the Marine Corps. What do you do with him? Suppose he is just one of these people who can't leave drugs alone and he keeps going back to them. What do you do with him then? Do you institute proceedings?

General WHEELER. If he is drug dependent, sir, and a backslider, he will be sent off to one of these centers. On the other hand, if he is in the exemption program and backslides, then in all probability he would receive a less than honorable discharge and be sent off again in the direction of the nearest VA hospital.

Senator ALLOTT. I gather from the way you are answering my questions that a lot of this depends on the individual case and on the individual commander who is handling that case.

General WHEELER. There is a certain amount of judgment that enters into it, Senator, although the instructions are rather clear. Really everything that can be done is done, we feel, consistent with what the President has directed and indicated. That is, he wants us to do everything we possibly can to insure that the man has had the best possible treatment prior to being discharged.

Senator ALLOTT. That is all. Thank you.

STATUS DURING VA HOSPITAL TREATMENT

Chairman ELLENDER. When he is finally separated from the corps and sent to the hospital, is it still at Government expense that he is treated?

General WHEELER. Yes, sir.

Chairman ELLENDER. He has no connection at all with the Marines after he leaves the hospital where you have given him a chance and he has failed to take advantage of it. He is on his own, but is taken care of at the hospital to which he is sent? Is that correct?

General ARMSTRONG. To which he may go.

Chairman ELLENDER. In the meantime you have given him his discharge.

General ARMSTRONG. Prior to going to the VA hospital; yes, sir.

Senator YOUNG. I wish you would describe the situation at the present time in regard to drug use in the service, including an indication as to whether it is increasing or decreasing, the measures that have been taken to combat it, and the effectiveness of those measures.

General WHEELER. In June of 1971, the Marine Corps began the involuntary urinalysis testing program in Vietnam. This program was designed to identify those individuals who were addicted to heroin prior to their departure from Vietnam to CONUS. This program has continued to expand to Okinawa, the Philippines, the Canal Zone, and both Marine Corps recruit depots. By July 1972, a worldwide random urinalysis sampling will be conducted on all Marine Corps personnel.

During July 1971, the Marine Corps adopted an exemption program which means that an individual is protected from punitive action under the Uniform Code of Military Justice or from administrative action leading to a discharge under other than honorable conditions for drug use if he voluntarily discloses his illegal involvement. Both of these programs have provided a means of identifying the drug user and providing him home help through a treatment and rehabilitation program. Those marines who are determined to be drug dependent are admitted to a Navy drug rehabilitation center for treatment and rehabilitation. In addition, our drug education programs have developed a great deal of awareness upon the part of our officers and enlisted personnel. Indications are that the problem is decreasing but we will be in a better position to measure both the extent of the problem and the effectiveness of our countermeasures after the worldwide random urinalysis screening program becomes operational.

PUBLIC AFFAIRS

Chairman ELLENDER. All right, you may proceed.

General WHEELER. As directed by the Congress, the Marine Corps reduced the manpower associated with public affairs. At the end of fiscal year 1971, 538 marines were serving in public affairs billets, 121 below the previous year. A further reduction of 20 will be taken during fiscal year 1972 which reflects congressional action on that year's budget. The manpower authorization requested for fiscal year 1973 reflects no further reduction over those already taken.

We include among public affairs functions those efforts devoted to internal information or troop information programs for marines and their families, such as the publication of post and station newspapers. However, the Marine Corps has affected congressional directed public affairs reductions largely in the realm of external public affairs as we believe the Congress intended. Further reductions would have the effect of limiting our ability to communicate with our troops and their dependents at a time when the need to improve internal communications is increasing, as has been noted by the Congress in its concern with the services' problems in such areas as drug abuse prevention, human relations and increasing the individual marine's awareness of career benefits.

INTELLIGENCE ACTIVITIES

Congress expressed concern that intelligence operations of the Department of Defense had grown beyond actual needs and directed an overall reduction in intelligence appropriations. None of the reduction was specifically directed at the Marine Corps, but the Department of Defense reduced the Marine Corps five personnel during their budget review. This cut was taken in the small headquarters staff. This staff produces no intelligence, nor does it duplicate any of the functions assigned the Defense Intelligence Agency.

The intelligence units and programs directly controlled by the Marine Corps are organized and equipped to provide combat intelligence to the Fleet Marine Forces. Coincidental with the withdrawal of marine forces from Vietnam, several reorganization/deactivating actions were directed and our strength in tactical intelligence assets is now essentially at pre-Vietnam levels.

PROLIFERATION OF GENERALS AND COLONELS

Congress also expressed concern over the number of high ranking officers in the Department of Defense and directed a review of the officer requirements of each of the services.

The Marine Corps has taken action to reduce the number of general officers, colonels and lieutenant colonels on active duty. For example, the planned number of general officers at the end of fiscal year 1973 is 71—plus one nonchargeable—which is below the Officer Grade Limitation Act limitation of 72. In addition, we shall have reduced the number of marines serving in the grades of lieutenant colonel and above from end fiscal year 1969 to end fiscal year 1973 by 24 percent or 700.

Chairman ELLENDER. That information is reflected in the table you referred to awhile ago?

General WHEELER. Yes, sir.

As previously mentioned, we have also lowered the proportion of the total officer force in the grades of colonel and lieutenant colonel at the end of fiscal year 1973 to a point below that in the pre-Vietnam years, 1959–65.

The actions which we have initiated to reduce general officer and colonel strength in the fiscal year 1972 and 1973 time period are fewer promotions to general officer grades; fewer promotions to colonel; a reduction in the number of regular colonels on active duty; and involuntary retirement and severance of a large percentage—12 of 27—of reserve colonel, lieutenant colonels and majors serving on active duty beyond their initial period of obligated service.

Further reductions in number of senior officers can only be accomplished by delaying promotions to these grades. This is true because of the tenure for officers in the senior grades provided by law. Any significant reduction of senior officer numbers will result in retarded promotion flow, increased aging of the entire officer force beyond desirable levels, and resulting unattractiveness of a military career. These factors in turn will impair our ability to attract and retain the caliber of careerists needed in our officer corps.

PROBLEM AREAS

I would like next to discuss a few problem areas and advise you of the progress that has been made toward solving them.

RACIAL UNREST

First, racial unrest and tension appear to have diminished throughout the Marine Corps. The potential for violence still exists but the numerous decentralized education and awareness programs established in our various commands are having a positive influence in reducing the causes of tension and alienation.

As a further step, the Commandant established an Advisory Committee for Minority Affairs in August of 1971. This committee, composed of prominent, national civilian leaders representing several races, was established to advise the Commandant on effective ways to make minority groups aware of the Marine Corps policy for equal opportunity, to ease racial tension, and to improve minority relations.

Marines on Overseas Unaccompanied Tours

During the peak of our Vietnam efforts, the interval between successive overseas tours was in many cases as short as 2 years. With the Marine Corps' presence in Vietnam virtually eliminated, the number of overseas unaccompanied billets has been decreased to the minimum, consistent with the requirement to maintain a ready, deployed force. This results in increasing the time that a marine may spend with his family between such tours and reduces, the number of personnel making permanent change of station moves in fiscal years 1972 and 1973.

Desertion

During the period of the Vietnam conflicts, the Marine Corps desertion rate rose to an all-time high as shown in the following table:

Selected annual desertion rates[1]

Fiscal years—	*Rate*
1942	17.3
1953	29.6
1965	18.8
1970	59.6
1971	56.1

[1] Total number of deserters per 1,000 average enlisted strength. At end fiscal year 1971 our desertion rate had improved slightly and fiscal year 1972 to date shows a similar slight improvement with repeat offenders a considerable part of the problem. Current data indicates that 45 percent of the monthly incidents are due to recidivists. Hopefully, the effects of our emphasis on quality in the recruiting program, our emphasis on professionalism, and the elimination of phasedown-related turbulence will improve these rates in the future.

Drug Abuse

General Wheeler. On July 19, 1971, the Marine Corps adopted a policy of exemption for those who voluntarily disclose their illegal involvement with drugs. Exemption under the terms of this policy means protection from punitive action under the Uniform Code of Military Justice or from administrative action leading to a discharge under other than honorable conditions for illegal drug use. This policy is intended to provide those marines who are sincere in seeking assistance for drug abuse connected problems with medical care, counseling and psychiatric treatment as necessary.

The exemption policy, which had granted 3,251 exemptions through January 15, 1972, allows marines to seek assistance for drug abuse problems without fear of punishment or administrative discharge under other than honorable conditions. Once a marine is granted exemption and a medical officer has determined his needs for medical treatment and psychiatric evaluation and counseling, the rehabilitation process begins at the local level. If, on the other hand, the medical officer determines that the exemptee is drug dependent, the exemptee is transferred to one of two U.S. Navy drug rehabilitation centers or a Veterans' Administration facility after undergoing necessary detoxification and treatment. About 300 such transfers have been made to date.

Considering the magnitude of the drug abuse problem as initially estimated, the Marine Corps 300 drug dependencies that have been medically reported since inception of our program are reassuring.

Further, these marines, with few exceptions, have had 30 to 60 days rehabilitation prior to discharge and have been directed to Veterans' Administration facilities near their homes of record. The Marine Corps feels it is pursuing an aggressive program in this area and that the problem as now known is less serious than originally anticipated.

Recruit Attrition

In early 1970, the Commandant initiated "Operation Improved Professionalism," with the goal of returning to a Marine Corps similar to that which existed in 1965. The years 1970 and 1971 served as a transition period, and marines who did not measure up to traditional high standards were separated. Recruit attrition rates rose from 4.2 percent in fiscal year 1968 to 22.0 percent in fiscal year 1971. The most significant increase occurred in discharges for reason of unsuitability.

The cause of these increased rates was the interaction of the forced acceptance of marginal accessions and the emphasis on higher standards of performance at recruit training. Examples of the lower quality input during this period can be found by examining the percentage of high school graduates (65 percent in fiscal year 1966 to 49 percent in fiscal year 1971), mean Armed Forces qualification test score (56.6 in fiscal year 1966 to 49.4 in fiscal year 1970), and the mandatory mental group IV quota of 24 percent with 12 percent of all accessions being new mental standards personnel.

Numerous initiatives were undertaken to reduce recruit attrition. They can be generally classified as efforts to identify potential prior to enlistment and efforts to identify the marginal man at an early stage of recruit training.

In June 1971, a goal of a recruit attrition rate of 10 percent or less was set. It is expected that this will be achieved when the final group entering recruit training in calendar year 1971 completes training.

In September of 1971, the General Accounting Office reported in a study that increased recruit attrition rates resulted from subjective application of higher standards at recruit training without accompanying guidance from higher authority or a noticeable change in the criteria for selecting quality accessions. However, it described the new enlistment standards implemented July 1, 1971, as a first step in solving the problem, and recognized that time was required to evaluate the impact.

Both recruit depots have made major changes in their programs with the goal of reducing attrition. The Marine Corps rates for June and July 1971 were 11 percent and 10.9 percent, respectively. As yet, the impact of the new programs and the higher enlistment standards are not fully evident, since recruits who did not meet the new standards were enlisted into the delayed enlistment program prior to July 1, 1971, and were still reporting to recruit training through December 1971. This is an area we are watching closely and in which we will take additional action if indicated.

Administrative Discharges

An analysis of administrative discharges from the Marine Corps during the period fiscal year 1967–71 must be viewed against the background of this country's commitment in the Republic of Vietnam and recent sociological changes within the United States.

In fiscal year 1965 the Marine Corps enlisted population was a relatively stable force of about 172,000, composed primarily of career marines and those serving on initial enlistments of 4 years.

The stability and quality of the enlisted force also contributed to a high level of experience and leadership in the Marine noncommissioned officer. In short, the Marine Corps entered the Vietnam conflict as a truly professional fighting force.

Unlike World War II and the Korean conflict, the expansion of the Marine Corps to meet its Southeast Asia commitment was not accompanied by mobilization of Reserve Forces or lengthy involuntary extension of enlistments. The buildup in Marine Corps strength was accomplished primarily through new procurement and sustained through a continuation of voluntary reenlistments and new accessions. The impact of this course of action on the stability and quality of the enlisted force was significant.

One immediate consequence was an increased requirement for experienced, high quality noncommissioned officers to augment the recruiting service and the training establishment—for to meet unit deployment schedules it was necessary to procure and train the maximum number of marines in the shortest possible time.

There was also a requirement for additional officers and noncommissioned officers to man newly activated units, as well as to replace those in nondeployed Fleet Marine Force elements which had been subject to temporary drawdown. Consequently, one-quarter of the total number of staff noncommissioned officers on active duty at the beginning of fiscal year 1966 were appointed to commissioned grades during that year; and many other superior noncommissioned officers were commissioned in subsequent years.

Other management actions also contributed to the turbulence within the enlisted force and to a dilution of the overall level of experience and quality. Two of the most significant were the requirement to procure an increasing number of men for 2-year terms of service, and the lowering of mental and physical standards for new accessions, notably through the implementation of Project 100,000. The magnitude of the turbulence is indicated by the 730,000 marines who served on active duty during fiscal years 1966 to 1971 with only 46,500 of the total providing continuity and professional leadership during the entire period.

In 1970, the Commandant of the Marine Corps recognized that the Corps' ability to respond to its Vietnam commitment in 1965 lay in its reservoir of skilled professionals which provided the essential nucleus upon which to build. Anticipating the current climate of military austerity, he also recognized that there was a requirement for each marine to be fully combat ready, high quality, and thoroughly professional. Accordingly, he issued a series of directives which emphasized the following:

a. More stringent application of requirements to complete recruit training.

b. Higher standards for reenlistment.

c. Use of administrative discharge procedures in cases of marines who clearly demonstrate that they will not or cannot measure up to Marine Corps standards.

The increase in the number of administrative discharges from the Marine Corps in fiscal years 1970 and 1971, as shown in the following table, is a direct result of this renewed emphasis on professionalism.

DISCHARGE RATES

[Per thousand average enlisted strength]

Reason/type	Fiscal year— 1967	1968	1969	1970	1971	[1] 1972
Misconduct:						
Honorable	0.02	0.07	0.02	0.03	0.17	0.26
General	0.1	0.2	0.1	0.3	1.7	4.3
Undesirable	1.9	2.2	2.2	15.6	27.6	12.1
Subtotal [2]	2.1	2.5	2.4	15.9	29.5	16.7
Unfitness:						
Honorable	0.02	0.02	0.03	0.12	0.12	2.9
General	0.1	0.3	0.2	1.3	3.4	9.5
Undesirable	1.4	1.7	2.1	5.9	7.8	3.5
Subtotal	1.5	2.0	2.4	7.4	11.4	15.9
Unsuitability:						
Honorable	2.8	6.3	9.7	31.8	45.8	19.1
General	7.3	4.8	5.4	13.5	25.8	14.7
Subtotal [2]	10.1	11.1	15.2	45.4	71.5	33.8
Totals: [2]						
Honorable	2.8	6.4	9.8	32.0	46.1	22.2
General	7.5	5.3	5.7	15.1	30.9	28.5
Undesirable	3.3	3.9	4.3	21.5	35.4	15.5
Grand total [2]	13.7	15.6	20.0	68.7	112.4	66.3

[1] Annualized rates for ½ year through Dec. 31, 1971.
[2] May not add to totals due to rounding.

DISCHARGE FOR MISCONDUCT

General WHEELER. The increase in the total number of discharges for reason of misconduct from fiscal year 1967 to fiscal year 1971 is attributable to discharges "for the good of the service." Marine Corps regulations provide that a marine may request discharge for the good of the service in a case where his conduct renders him triable by court-martial for an offense punishable by punitive discharge.

The specific offense upon which each of these discharges was based cannot be determined; however, for the most part, marines request discharge to escape trial by court-martial for drug abuse or prolonged periods of unauthorized absence. The type of discharge awarded is based upon the character of the marine's service as reflected in his military service record for the current enlistment and any extensions thereof.

DISCHARGE FOR UNFITNESS

The increase in the total number of discharges for reasons of unfitness from fiscal year 1969 to fiscal year 1970 and from fiscal year 1969 to fiscal year 1971 is primarily attributable to drug abuse.

DISCHARGE FOR UNSUITABILITY

In particular, the increase in the total number of discharges for unsuitability reflects the Marine Corps renewed emphasis on professionalism. Discharges based on inaptitude, defective attitude, and apathy among recruits represent the most significant increases. The type of discharge awarded in these cases, as with other administrative discharges, is determined by the character of the marine's service

record. The relatively high percentage of honorable discharges reflects the circumstances under which these marines were separated, for instance, recruits separated for inaptitude.

PROGRESS TOWARD ENDING RELIANCE ON DRAFT

I would like next to discuss the Marine Corps progress toward ending reliance on the draft. I will briefly discuss progess to date; plans for all-volunteer force funds in the current budget, and future efforts.

First, I would like to make it clear that the Marine Corps has supported and will continue to support the goal of an all-volunteer force by July 1, 1973, contingent upon the availability of manpower of high quality and in sufficient quantity to support Marine Corps needs. We feel, however, that a necessary backup for such a force is a responsive standby draft.

The Marine Corps is traditionally a volunteer force and has satisfied its peacetime and the bulk of its wartime accession requirements without the use of selective service inductees. However, the Marine Corps has been dependent to a marked degree on draft pressure to satisfy both officer and enlisted accession requirements.

The increased compensation which the Congress has provided is essential, but that alone will not be sufficient to achieve an all-volunteer Armed Force. An enhanced recruiting capability and significant improvements in all aspects of service life for marines and their dependents are also required.

An outline of the all-volunteer force funding in the fiscal year 1973 budget will illustrate the efforts by the Marine Corps to meet these needs.

The all-volunteer funds in the fiscal year 1973 budget cut across appropriations. The bulk of the funds, however, merely continue programs begun in fiscal year 1972 at the same level of effort. A summary of fiscal year 1973 all-volunteer force funds by appropriation is set forth in the table below.

(The table follows:)

FISCAL YEAR 1973 ALL-VOLUNTEER FORCE FUNDING

Appropriation/item	Amount (millions)	Personnel	
		Military	Civilian
MPMC:			
Active duty recruiting	$10.6	933	
Reserve recruiting	1.0	86	
Education	4.4	323	
Family assistance	1.4	126	
Total MPMC	17.4	1,468	
RPMC: PLC subsistence	1.4		
Total RPMC	1.4		
O. & M.M.C.:			
Active duty officer and enlisted recruiting	7.3		26
Reserve recruiting	.5		
Barracks improvement	2.7		
Education	.4		1
Civilianization of messhalls	1.1		650
Extended commissary hours	.9		107
Total, O. & M.M.C	12.9		784

Appropriation/item	Amount (millions)	Personnel	
		Military	Civilian
MCON (Navy): Barracks improvement	$3.3		
Total MCON (Navy)	3.3		
FHMA: Active duty recruiting (leased housing)	1.9		
Total FHMA	1.9		
Grand total	36.9	1,468	784

RECRUITING

General WHEELER. Of the $37 million total, $22.1 million—60 percent—is earmarked to enhance active duty officer and enlisted recruiting programs.

Chairman ELLENDER. Is that for advertising?

General WHEELER. Advertising, increased numbers of vehicles, everything of that nature to enhance the recruiting.

Chairman ELLENDER. That is an additional cost, is it not, to what you spent before?

General WHEELER. Yes, sir.

Chairman ELLENDER. Or did you spend as much as that previously?

General WHEELER. It is about the same level as 1972.

The following table illustrates the resources that are planned to be employed in the recruiting service:

(The table follows:)

RECRUITING RESOURCES

	Fiscal year—		
	1971	1972	1973
Facilities	764	939	979
Vehicles	1,021	1,417	1,648
Military personnel	2,177	2,777	2,863
Civilian personnel	75	104	104

VOLUNTEERS AND REENLISTMENTS

General WHEELER. It is not possible to separately measure the impact of any one part of the all-volunteer effort. However, there are aggregate indications of our progress which are being monitored.

These include the percentage of true volunteers recruited, the accession and retention experience as compared with our goals, and our morale and discipline experience. The more significant of these indications are summarized as follows:

The percentage of the true volunteers, estimated through an analysis of random sequence numbers, increased throughout calendar year 1971, reaching a high of 83 percent in December with a cumulative average of 71 percent for the year.

Senator ALLOTT. By "true volunteers," you mean not draft induced?

General WHEELER. Yes, that is what we mean.

The fiscal year 1972 enlisted procurement shortfall through December 31, 1971, is abou t 4.5 percent of quota. The percentage of high

school graduates was 49.9 percent in fiscal year 1971. Percentage of high school graduates thus far in fiscal year 1972 is 55.6 percent, but includes the high percentage of graduates in the summer months.

The Marine Corps is still averaging 26 percent of new enlistees in the upper two mental groups as compared to 31 percent for the Army, 46 percent for the Navy, and 40 percent for the Air Force.

ALL VOLUNTEER FORCE

Chairman ELLENDER. Please provide for the record a statement similar to that furnished last year in connection with the all-volunteer force.

General WHEELER. I will be glad to do so. Itemized below are those areas of the fiscal year 1973 DOD zero draft funding request which relate to the military personnel, Marine Corps appropriation.

(The information follows:)

MILITARY PERSONNEL, MARINE CORPS—FUNDING REQUESTED FOR PROJECT VOLUNTEER

[In millions of dollars]

		Personnel		
		Fiscal year 1972 carryover	Fiscal year 1973 increment	Fiscal year 1973 total
Recruiting (active duty) (10.6):				
Personnel:				
Officers	9.9	45	24	69
Enlisted men		555	309	864
Special duty assignment: Pay	.7			
Recruiting (Reserve) (1.0):				
Personnel (Reserve recruiters):				
Officers	1.0	6	0	6
Enlisted men		80	0	80
Education (4.4):				
Associate degree program: Enlisted men	1.0	100	0	100
Bachelor and advanced degree: Program for officers	2.4	120	0	120
Bachelor degree program for SNCO's	1.0	103	0	103
Service Initiatives (1.4):				
Family assistance program:				
Officers	1.4	23	0	23
Enlisted men		103	0	103
Total	17.4			

RECRUITING (ACTIVE DUTY), $10,600,000

RECRUITING PERSONNEL—MILITARY, $9,868,000

The Five-Year Defense Plan called for a reduction in the recruiting service of 24 officers and 223 enlisted. These personnel were retained in their present billets during FY 72 by effecting a temporary drawdown on the Fleet Marine Force. An increase in end strength is required or the Marine Corps will lose 247 of its recruiting personnel as Zero Draft is approached and attaining recruit quotas is becoming more and more difficult. Of the 24 officers and 309 enlisted requested for FY 73, 24 officers and 223 enlisted are required to maintain present number of recruiting personnel on station and the net increase of 86 would be enlisted canvassers.

SPECIAL DUTY ASSIGNMENT PAY, $700,000

Provides Special Duty Assignment Pay (Pro Pay) at the rate of $50 per month for the additional recruiters requested under FY 73 Zero Draft. In addition, funds must be carried over for those receiving such pay (enlisted recruits and officer selection officer assistants) as a result of the FY 72 Zero Draft per-

sonnel increase. The arduous nature and financial hardships associated with recruiting duty tend to discourage qualified personnel from volunteering for such duty. Often, personnel assigned to recruiting duty lose access to commissaries, exchanges and medical facilities intended for use by military personnel and their dependents.

RECRUITING (RESERVE) $1,000,000

RECRUITING PERSONNEL—MILITARY, $1,032,000

Authorization was received under FY 72 Zero Draft to place on active duty 6 Reserve officers and 80 Reserve staff noncommissioned officers, train them in recruiting procedures and techniques, and assign them to Reserve recruiting duty in their home communities. In the past, Reserve recruiting has been an additional duty of Inspector-Instructor personnel. Funding is requested to continue the program in FY 73.

EDUCATION, $4,400,000

ASSOCIATE DEGREE PROGRAM, $985,000

The expansion of this education program by 100 enlisted Marines was authorized under FY 72 Zero Draft. Funding is requested to continue the program in FY 73. Studies and surveys have continually indicated that increased educational opportunities are significant enlistment and reenlistment incentives. These student billets will provide a broader, more technically qualified corps of NCO's. The program permits attendance for a two-year period to obtain an associate degree.

BACHELOR AND ADVANCED DEGREE PROGRAM FOR OFFICERS, $2,422,000

The 120 additional student billets were authorized under FY 72 Zero Draft and funding is requested for the carry-over cost of continuing the program.

BACHELOR DEGREE PROGRAM FOR SNCO'S, $1,015,000

The additional 103 enlisted billets were authorized under FY 72 Zero Draft (100 students and 3 enlisted support personnel). To increase the professionalism of the SNCO corps, and to serve as an incentive for procurement and retention. SNCO's of extremely high caliber with the appropriate prerequisites for college entrance at the third year would be assigned to fully accredited colleges or universities.

SERVICE INITIATIVES $1,400,000

FAMILY ASSISTANCE PROGRAM, $1,422,000

Authorization for the 23 officer and 103 enlisted billets was received under FY72 Zero Draft and funding is requested to continue the program. Family assistance benefits play a key role in the retention of quality personnel. Immediate information on housing, schools, temporary lodging, medical facilities, vehicle registration and like items, should be available to Marine families wherever they are assigned. 23 officers and 46 enlisted are assigned to 23 active-duty installations, and 57 enlisted men are assigned to a like number of Reserve units. Formerly, no family assistance billets were authorized for the Marine Corps.

General WHEELER. Thus far in fiscal year 1972, first term and career reenlistment rates have been slightly higher than the fiscal year 1971 average.

Seventy-five percent of quota has been achieved for the first three officer candidate classes convening during fiscal year 1972. Results to date in the platoon leaders class program are inconclusive as applicants are required to submit a transcript of first semester grades. First significant enrollment increases occur in April.

Confinement rates have not changed significantly from fiscal year 1971 through December 1972. Significant racial incidents for the the period September–December 1971 have decreased markedly from

summer 1971. Continued monitoring should show whether this is predominantly due to seasonal variation.

Reserve recruiting results for the period July 1–December 31, 1971 totaled 2,113 enlistees of a quota of 4,890. In addition, 41 percent of new enlistees for the first quarter of fiscal year 1972 were not graduated from high school compared to a fiscal year 1971 total of 19 percent.

Mr. Chairman, members of the committee, the Marine Corps is requesting $1.54 billion to fund an end strength of 197,965 marines and an average strength of 198,391 in fiscal year 1973.

We believe the funds requested are the optimal balance between the need to reduce manpower costs and the requirement to maintain a high quality, ready and professional military force while striving to achieve the objective of an all-volunteer force in a zero draft environment.

We ask your support in attaining our objective.

I will be pleased to try to answer any questions you may have.

RECRUIT ATTRITION

Chairman ELLENDER. In regard to your volunteer program, to what extent are the applicants accepted? Do you have ways and means of testing them before you accept them?

General WHEELER. Yes, sir. As of October 1 last year, and I presume, Mr. Chairman, you are pursuing this thing called recruit attrition.

Chairman ELLENDER. Yes.

General WHEELER. One of the many actions that we took last year—this one went into effect on October 1—was to require our recruiters nationwide to give each applicant who applied for the Marine Corps a test. Actually this test is reading and comprehension ability at the fourth-grade level. It was used to screen out the ones who couldn't read. That was one step that we took to try to reduce recruit attrition.

Chairman ELLENDER. What about testing for drug abuse? Do you go into that, too?

General WHEELER. We don't test them at the entry level until they reach the depots. Once they do report to either Parris Island or San Diego, they are indeed given a urinalysis test.

Chairman ELLENDER. In other words, that is previous to taking them in?

General WHEELER. No, sir; this is after they are in.

DRUG ABUSE REJECTIONS

Chairman ELLENDER. Do you find many that you have to turn down because of drug abuse?

General WHEELER. Hardly any, Mr. Chairman. Of the total of about 30,000 urinalysis tests that have been given, 73 have proved positive.

Chairman ELLENDER. Do many of them readily admit drug abuse? Of those you found who were addicted to drugs, were you able to obtain from them prior to their admission in the Marine Corps that they had been drug addicts?

General WHEELER. No, sir; because before they sign up for the Marine Corps they must respond to a question whether or not they have

used drugs before and the answer must be in the negative before the Marine Corps will sign them up.

Chairman ELLENDER. You say you had 30,000 tests and of those who showed drug addiction you simply dismissed them? You did not deal with them at all?

General WHEELER. The ones that were discovered in the recruit depots were evaluated for intention; and those that were discharged I am sure were discharged with probably a general discharge I might say, Mr. Chairman, these urinalysis tests really don't detect addiction. They merely detect use.

Chairman ELLENDER. Yes, I understand. Thank you.

Senator YOUNG. I have a couple of questions.

VENEREAL DISEASE

Do you have a venereal disease problem in the Marines? Is it on the increase or decrease?

General WHEELER. Senator, I don't know that we have a problem. I would gather that we don't have a problem of any significant proportions because it has not come to our attention in the Marine Corps as one of any great dimension. I see and I read that it is in the country as a whole. To my knowledge, it has not reared its head as a problem of any great dimension; no, sir.

Senator YOUNG. I think the drug problem in the Marines, percentagewise, is less than in the other Services, is it not?

General WHEELER. I am not prepared to make comparisons, Senator. I don't know.

PERSONNEL STATIONED IN OKINAWA AND JAPAN

Senator YOUNG. One more question. How many marines do we have stationed in the Far East and where are they?

General WHEELER. Including marines stationed in Okinawa and Japan who are members of the 3d Marine Division and the 1st Marine Aircraft Wing, we have about 27,000 in the Far East.

Senator YOUNG. How many with the fleet?

General WHEELER. They are all part of the 7th Fleet.

Senator YOUNG. How many are aboard ships of the 7th Fleet?

General WHEELER. At any one time we keep a marine amphibious unit embarked in amphibious vessels of the 7th Fleet. That is about a 2,000 man air-ground force that comes from the 3d Division and 1st Wing on Okinawa and in Japan, they keep a unit rotating to the ships.

TIME ELEMENT FOR MOVEMENT OF DIVISION FROM OKINAWA TO VIETNAM

Senator YOUNG. The purpose in asking the question is this: If we got into serious trouble at a particular base in Vietnam, how long would it take one of your divisions to get there?

General WHEELER. How long would it take to get one of our divisions over there?

Senator YOUNG. Say from Okinawa.

General WHEELER. Just as long as it takes to get the ships and the aircraft there, sir. The 7th Fleet, of course, operates in that area at all time. I would say that it wouldn't take too long to move that division.

REIMBURSABLE OBLIGATIONS

Chairman ELLENDER. Please explain the reimbursable obligations on pages 3–4 of the justifications.

General WHEELER. These reimbursables represent the estimated dollars we will collect for goods and services rendered. They consist of the salaries for 23 officers and enlisted personnel who work for agencies outside the Department of Defense, for sale of meals, sale of bulk subsistence, sale of clothing, and for travel performed by Marine embassy guards working for the State Department.

SCHEDULE OF INCREASES AND DECREASES

Chairman ELLENDER. At this point in the record there will appear the schedule of increases and decreases in the fiscal year 1973 program as it appears in the justifications.

(The information follows:)

Schedule of increases and decreases (over $200,000)

[In millions of dollars]

BUDGET ACTIVITY, FISCAL YEAR 1972

1. Pay and allowances, officers	315.3
Increases:	
(*d*) Basic allowances for quarters increases due to full 12-month increase in rates versus 8 months' effective rate in fiscal year 1972	+1.8
(*j*) Federal Insurance Contribution Act (FICA) increase due to individual tax base increase from $7,800 to $9,000 and an increased deduction percentage	+.6
Decreases:	
(*b*) Incentive pay reduced based on a reduction in number of flying duty crew members	−.8
(*c*) Special pay decrease due to discontinued support of free world forces	−1.2
(*e*) Subsistence decrease directly related to reduced officer strength	−.6
(*i*) Separation payments decrease due to the reduced number of officer separations in fiscal year 1973	−5.7
Fiscal year 1973 pay and allowances, officers	[1] 309.4
2. Pay and allowances, enlisted personnel	1,007.3
Increases:	
(*a*) Basic pay increases due to full 12-month pay increases versus only 8- and 6-month increases in fiscal year 1972	+67.9
(*d*) Proficiency pay increase due to an expansion of the specialty pay program	+.6

[1] Figures do not add due to rounding.

Schedule of increases and decreases (over $200,000)—Continued

2. Pay and allowances, enlisted personnel—Continued	
Increases—Continued	
(e) Reenlistment bonus increase is directly related to the expanded military skills covered by the variable reenlistment bonus program as approved by OSD	+1.8
(f) Basic allowance for quarters increase due to full 12-month rate increase versus 8 months for fiscal year 1972 and a small increase in the marriage factor	+8.2
(j) Separation payments increases due to full 12-month rate increases	+3.1
(k) Federal insurance contribution (FCIA) increases due to individual tax base increase from $7,800 to $9,000 and an increased deduction percentage	+5.6
Decreases:	
(b) Incentive pay decreases due to a reduction in the number of flying duty crew members	—.5
(c) Special pay reduction is based on the discontinued support of free world forces and the reduced number of Marines overseas	—7.6
(i) Clothing allowances decrease due to reduction in strength	—.5
Fiscal year 1973 pay and allowances, enlisted personnel	[1] 1,086.0
4. Subsistence of enlisted personnel	78.1
Increases	None
Decreases:	
(a) Basic allowance for subsistence reduced number of personnel authorized to mess separately	—.3
(b) Subsistence in kind decreases are directly related to the reduction in strength and discontinued support of free world forces	—3.2
Fiscal year 1973 subsistence of enlisted personnel	74.6
5. Permanent change of station travel	70.8
Increases:	
(b) Training travel increases due to stabilization of the corps which enables total required training to be performed	+.9
(c) Operational travel net increase is a result of a reduction in officer moves and an increase in enlisted moves	+.6
Decreases:	
(d) Rotation travel to and from overseas decreases based on deployment changes and a reduction in tariff rates	—5.3
(e) Separation travel decreases due to the strength leveling off and the stabilization of the force which reduces number of separations	—1.7
Fiscal year 1973 permanent change of station travel	65.3
6. Other military personnel costs	3.9
Increases	None
Decreases: (c) Payment of death gratuities decrease is a result of the discontinued support of free world forces	—1.4
Fiscal year 1973 other military personnel costs	2.5

SUMMARY OF MILITARY PERSONNEL STRENGTH

Chairman ELLENDER. A summary of military personnel strength will also appear in the record at this point.

(The information follows:)

SUMMARY OF MILITARY PERSONNEL STRENGTH

	Fiscal year 1971 actual		Fiscal year 1972 planned		Fiscal year 1973 planned	
	Man-years	End strength, June 30, 1971	Man-years	End strength, June 30, 1972	Man-years	End strength, June 30, 1973
Direct program:						
Officers	23,251	21,744	20,494	19,791	19,381	19,112
Enlisted	211,080	190,602	182,766	178,206	178,987	178,830
Subtotal	234,331	212,346	203,260	197,997	198,368	197,942
Reimbursable program: [1]						
Officers	21	21	21	21	21	21
Enlisted	2	2	2	2	2	2
Subtotal	23	23	23	23	23	23
Total program:						
Officers	23,272	21,765	20,515	19,812	19,402	19,133
Enlisted	211,082	190,604	182,768	178,208	178,989	178,832
Total	234,354	212,369	203,283	198,020	198,391	197,965

[1] Military personnel assigned to agencies outside of Department of Defense on a reimbursable basis under the provisions of 10 USC 8230 (Marine Corps).

ACTIVE DUTY MILITARY PERSONNEL MANPOWER BY BUDGET ACTIVITY

Chairman ELLENDER. At this point in the record there will appear the tabulation from the justifications showing the active duty military personnel manpower by budget activity.

ACTIVE DUTY MILITARY PERSONNEL MANPOWER BY (FYDP) PROGRAM AND BUDGET ACTIVITY

[Dollars in thousands; end strengths in whole numbers]

Program activity	Fiscal year 1971 actual	Fiscal year 1972 estimate	Fiscal year 1973 estimate
Direct program:			
1. Strategic forces:			
Operation of the Marine Corps:			
Costs	$759	$916	$1,001
End strengths:			
Officer	8	9	9
Enlisted	170	132	132
Total	178	141	141
2. General purpose forces:			
Operation of the Marine Corps:			
Costs	800,465	844,660	908,220
End strengths:			
Officer	11,273	10,249	9,964
Enlisted	114,935	114,838	115,649
Total	126,208	125,087	125,613
Operation of defense agencies:			
Costs	75	151	86
End strengths:			
Officer	5	9	5
Enlisted	1	2	1
Total	6	11	6
Total, general purpose forces:			
Costs	800,531	844,811	908,306
End strengths:			
Officers	11,278	10,258	9,969
Enlisted	114,936	114,840	115,650
Total	126,214	125,098	125,619

ACTIVE DUTY MILITARY PERSONNEL MANPOWER BY (FYDP) PROGRAM AND BUDGET ACTIVITY—Continued

[Dollars in thousands; end strengths in whole numbers]

Program activity	Fiscal year 1971 actual	Fiscal year 1972 estimate	Fiscal year 1973 estimate
3. Intelligence and communications:			
Operation of the Marine Corps:			
Costs	9,929	11,245	12,424
End strengths:			
Officer	123	129	129
Enlisted	1,463	1,618	1,620
Total	1,586	1,747	1,749
Operation of defense agencies:			
Costs	4,103	4,583	4,884
End strengths:			
Officer	110	116	110
Enlisted	471	485	482
Total	581	601	592
Total, intelligence and communications:			
Costs	14,032	15,828	17,308
End strengths:			
Officer	233	245	239
Enlisted	1,934	2,103	102
Total	2,167	2,348	2,341
5. Guard and Reserve:			
Operation of the Marine Corps:			
Costs	30,439	33,755	35,894
End strengths:			
Officer	643	445	496
Enlisted	4,592	4,304	4,304
Total	5,235	4,749	4,800
6. Research and development:			
Research and development Marine Corps:			
Costs	552	562	563
End strengths:			
Officer	26	22	19
Enlisted	38	38	33
Total	64	60	52
Research and development, defense agencies:			
Costs	14	15	16
End strengths:			
Officer	1	1	1
Enlisted	0	0	0
Total	1	1	1
Total, research and development:			
Costs	566	577	579
End strengths:			
Officer	27	23	20
Enlisted	38	38	33
Total	65	61	53
7. Central supply and maintenance:			
Operation of the Marine Corps:			
Costs	18,922	18,056	16,705
End strengths:			
Officer	334	253	253
Enlisted	2,515	1,948	1,948
Total	2,849	2,201	2,201
Operation of defense agencies:			
Costs	476	528	550
End strengths:			
Officer	29	34	34
Enlisted	0	1	1
Total	29	35	35

ACTIVE DUTY MILITARY PERSONNEL MANPOWER BY (FYDP) PROGRAM AND BUDGET ACTIVITY—Continued

[Dollars in thousands; end strengths in whole numbers]

Program activity	Fiscal year 1971 actual	Fiscal year 1972 estimate	Fiscal year 1973 estimate
Total, central supply and maintenance:			
Costs	19,398	18,584	17,255
End strengths:			
Officer	363	287	287
Enlisted	2,515	1,949	1,949
Total	2,878	2,236	2,236
8. Training, medical and other general personnel activities:			
Operation of the Marine Corps:			
Costs	534,188	491,924	500,620
End strengths:			
Officer	7,475	6,857	6,457
Enlisted	61,431	50,041	49,913
Total	68,906	56,898	56,370
Operation of defense agencies:			
Costs	10	6	6
End strengths:			
Officer	0	0	0
Enlisted	1	1	1
Total	1	1	1
Total, training, medical and other general personnel activities:			
Costs	534,198	491,930	500,626
End strengths:			
Officer	7,475	6,857	6,457
Enlisted	61,432	50,042	49,914
Total	68,907	56,899	56,371
9. Administration and associated activities:			
Operation of the Marine Corps:			
Costs	43,941	52,187	52,616
End strengths:			
Officer	1,479	1,448	1,426
Enlisted	4,888	4,664	4,633
Total	6,367	6,112	6,059
Operation of defense agencies:			
Costs	1,044	1,097	1,083
End strengths:			
Officer	68	68	62
Enlisted	8	9	14
Total	76	77	76
Total, administration and associated activities:			
Costs	44,985	53,284	53,699
End strengths:			
Officer	1,547	1,516	1,488
Enlisted	4,896	4,673	4,647
Total	6,443	6,189	6,135
10. Support of other nations:			
Operation of the Marine Corps:			
Costs	16,732	15,701	3,124
End strengths:			
Officer	170	151	147
Enlisted	89	125	99
Total	259	276	246
Direct program summary:			
Operation of the Marine Corps:			
Costs	1,455,366	1,468,444	1,530,604
End strengths:			
Officer	21,505	19,541	18,881
Enlisted	190,083	177,670	178,298
Total	211,588	197,211	197,179

ACTIVE DUTY MILITARY PERSONNEL MANPOWER BY (FYDP) PROGRAM AND BUDGET ACTIVITY—Continued

[Dollars in thousands; end strengths in whole numbers]

Program activity	Fiscal year 1971 actual	Fiscal year 1972 estimate	Fiscal year 1973 estimate
Operation of defense agencies:			
Costs	5,708	6,365	6,609
End strengths:			
Officer	212	227	211
Enlisted	481	498	499
Total	693	725	710
Research and development, Marine Corps:			
Costs	552	562	563
End strengths:			
Officer	26	22	19
Enlisted	38	38	33
Total	64	60	52
Research and development, defense agencies:			
Costs	14	15	16
End strengths:			
Officer	1	1	1
Enlisted	0	0	0
Total	1	1	1
Total, direct program:			
Costs	1,461,640	1,475,386	1,537,792
End strengths:			
Officer	21,744	19,791	19,112
Enlisted	19,602	178,206	178,830
Total	212,346	197,997	197,942
Reimbursable program:			
Costs	11,895	6,500	6,200
End strengths:			
Officer	21	21	21
Enlisted	2	2	2
Total	23	23	23
Total, Marine Corps:			
Costs	1,473,535	1,481,886	1,543,992
End strengths:			
Officers	21,765	19,812	19,133
Enlisted	190,604	178,208	178,832
Total	212,369	198,020	197,965

STRATEGIC FORCES

Chairman ELLENDER. For "Strategic forces" for fiscal year 1973 the request is $1,001,000, an increase over the $916,000 provided for fiscal year 1972. Is this increase associated with pay costs?

General WHEELER. Yes sir; that is correct.

Senator YOUNG. Please describe generally what the 141 personnel assigned to this activity are engaged in.

General WHEELER. 136 of these marines are serving aboard fleet ballistic missile submarine tenders. The remaining five are assigned staff positions in the Continental Air Defense Command and Joint Planning Staff.

GENERAL PURPOSE FORCES

Chairman ELLENDER. For "General purpose forces" the fiscal year 1973 request is $908,306,000, an increase over the $844,811,000 provided for fiscal year 1972. I notice that there is a slight reduction

in officer personnel but an increase in the number of enlisted personnel. Is there a particular reason for this increase?

General WHEELER. The increase of enlisted spaces in this program represents our effort to improve readiness by assigning a greater portion of our enlisted marines to our fighting forces. The increase is made possible through streamlining training procedures which result in a reduction in program eight.

Chairman ELLENDER. Does this increase in enlisted personnel and the pay increase account for the additional funding request?

General WHEELER. Yes, sir; both factors contribute to the additional funding request, but the pay increase accounts for the major portion of the additional funds requested.

Senator YOUNG. Please describe generally what is encompassed in the term "general purpose forces."

General WHEELER. More than half of our total manpower is devoted to "General purpose forces." The marine divisions, aircraft wings, force troops, which constitute the Fleet Marine Force, are in this program as are the bases at which they are located. Other elements in this program include marine detachments aboard Navy attack and antisubmarine warfare carriers and cruisers, marines assigned as security forces at naval bases, marines on unified and specified command staffs, and marines serving in marine air training groups.

Chairman ELLENDER. What is the function of the six personnel assigned to "operation of defense agencies"?

General WHEELER. The six marines shown under "operation of defense agencies" are assigned to the TRI–TAC program. TRI–TAC is a joint tactical communications program under Defense Department supervision.

INTELLIGENCE AND COMMUNICATIONS

Chairman ELLENDER. For "Intelligence and communications" the fiscal year 1973 request is $17,308,000, an increase over the $15,828,000 provided for fiscal year 1972. Please justify this increase.

General WHEELER. The increase is primarily due to the pay raise passed in fiscal year 1972 only being in effect for about half of fiscal year 1972 but for all of fiscal year 1973.

Chairman ELLENDER. Included in the total is $4,884,000 for "Operation of defense agencies." I note that 592 officers and enlisted personel will be assigned to this activity in fiscal year 1973. Please describe their functions.

General WHEELER. 471 Marines perform security functions for the National Security Agency at Fort Meade, Md. The Defense Intelligence Agency has 21 marines serving as defense attachés and an additional 24 assigned to DIA headquarters. The Defense Nuclear Agency has six marines serving in liaison billets. Forty-seven marines are assigned to the Defense Communications Agency in the consolidated telecommunications program. The remaining 23 marines are on the staff of the Joint Chiefs of Staff in the National Military Command System.

Chairman ELLENDER. How much of the total of this activity and how many personnel are to be allocated to intelligence and to communications?

General WHEELER. 2,264 marines are allocated to intelligence activities as shown in the special analyses on pages 3–78 of the "Military personnel, Marine Corps" budget. Forty-seven marines are assigned to the Defense Communications Agency and one marine is assigned to the Navy Communications Command. The remaining 29 marines in program three are assigned to the Defense Nuclear Agency and to the National Military Command System.

GUARD AND RESERVE

Chairman ELLENDER. For "Guard and Reserve" for fiscal year 1973 the request is $35,894,000, an increase over the $33,755,000 provided in fiscal year 1972. I also note that you plan to increase the end strength from 4,749 to 4,800. Please justify the increase in cost personnel.

General WHEELER. The increase in fiscal year 1973 costs over those in fiscal year 1972 is primarily due to pay increases but does include a strength of 51 officers. The officer increase reflects restoration of a part of the programed reduction from fiscal year 1971 to fiscal year 1972. Some of that reduction was predicated upon designating certain billets to be filled by reservists on active duty under provisions of United States Code, title 10, section 265, and funded by the "Reserve personnel, Marine Corps" appropriation. The Secretary of Defense determined that 51 of these billets could not legally be designated and directed that the reserve and the military personnel budgets be adjusted accordingly.

Chairman ELLENDER. Describe the principal functions of these 496 officers and 4,304 enlisted personnel.

General WHEELER. These marines provide staff and technical support to the reserve establishment. A requirement for active duty manpower exists at the headquarters level of the 4th Marine Division and 4th Marine Aircraft Wing, at lower echelon reserve units, and at Marine Corps district headquarters. The functions performed at these locations vary; they include administrative support, training assistance, and equipment maintenance.

RESEARCH AND DEVELOPMENT

Chairman ELLENDER. For "Research and development" the fiscal year 1973 request is $579,000, about the same amount as the $577,000 provided for fiscal year 1972. Please describe the utilization of the 20 officers and 33 enlisted personnel assigned to this activity.

General WHEELER. These marines represent Marine Corps support of, or liaison with, various weapons development agencies. The Navy air development squadrons and test support activities at Point Mugu, Calif., have 40 marines assigned. The remaining marines are in weapons evaluation units at Kirtland Air Force Base and Fort Bliss, except for one officer assigned to a Defense Department research project.

CENTRAL SUPPLY AND MAINTENANCE

Chairman ELLENDER. For "Central supply and maintenance" for fiscal year 1973 the request is $17,255,000, somewhat less than the $18,584,000 provided for fiscal year 1972. I note, however, that the planned end strength for fiscal year 1973 is identical to that for fiscal year 1972: 287 officers and 1,949 enlisted personnel. Please explain how the reduction in cost is accomplished.

General WHEELER. It is true, sir, that end strength will not change between fiscal year 1972 and fiscal year 1973. However, average strength, or manyears, will decrease and the decrease is of such magnitude that it more than offsets the increased costs associated with pay raises.

Chairman ELLENDER. Describe the utilization of the 35 personnel assigned to "Operation of defense agencies."

General WHEELER. These 35 marines serve with the Defense Supply Agency in various capacities. We provide marines to assist in the operation of that Agency and, in return, we receive supply support from the Agency.

Senator YOUNG. Please describe generally the function of personnel assigned to this activity.

General WHEELER. These marines man our supply and maintenance facilities at Albany, Ga.; Barstow, Calif.; and Philadelphia, Pa. These establishments provide the central supply support and depot level maintenance for the rest of the Marine Corps. Some marines in "Central supply and maintenance" serve with the Defense Supply Agency and with Navy supply activities.

TRAINING, MEDICAL, AND OTHER GENERAL PERSONNEL ACTIVITIES

Chairman ELLENDER. For "Training, medical, and other general personnel activities" for fiscal year 1973 the request is $500,626,000, an increase over the $491,930,000 provided for fiscal year 1972. Please justify the increase.

General WHEELER. The increase is primarily due to the pay raise passed in fiscal year 1972 only being effective for approximately half of fiscal year 1972 but the whole of fiscal year 1973.

Senator YOUNG. Would you indicate generally just what is included in this activity?

General WHEELER. This program contains the following functions and activities:

1. Recruit training.
2. Specialized training.
3. Professional training.
4. Flight training.
5. Instructors at the Naval Academy and NROTC units.
6. Patients.
7. Prisoners.
8. Recruiting and examining.
9. Transients.

ADMINISTRATION AND ASSOCIATED ACTIVITIES

Chairman ELLENDER. For "Administration and associated activities" the fiscal year 1973 request is $53,699,000, approximately the same amount as the $53,284,000 provided for fiscal year 1972. Indicate the general nature of this activity, please.

General WHEELER. A breakdown of the 6,059 marines in "Administration and associated activities" follows:

Headquarters, Marine Corps	1,141
Other field activities (Navy and Marine Corps)	2,680
Other headquarters support (Navy and Marine Corps)	1,720
Public affairs	518
Total	6,059

"Other field activities" include headquarters battalion, Headquarters Marine Corps; the Marine Barracks at Eighth and I Streets in Washington, D.C.; the Marine Corps Band; and numerous other separate line items such as Presidential aides and the liaison officer to the Southeast Asia Treaty Organization.

"Other headquarters support" includes marines assigned to the State Department, the Presidential Support Helicopter Squadron, and numerous other line items such as the pilot exchange program with the U.S. Air Force.

Chairman ELLENDER. Of the total $1,083,000 is earmarked for "Operation of defense agencies." What is the purpose of this?

General WHEELER. These funds represent an estimate of total manpower costs incurred by the 27 billets on the staff of the Secretary of Defense and 49 billets with the Staff of the Joint Chiefs of Staff.

SUPPORT OF OTHER NATIONS

Chairman ELLENDER. For the "Support of other nations" in the fiscal year 1973 request is $3,124,000, a marked decrease from the $15,701,000 provided for fiscal year 1972. Please describe this discontinued support of free world forces.

General WHEELER. In this appropriation $12,648,000 was budgeted for support of free world forces in fiscal year 1972. This support consisted of overseas allowances for officer and enlisted personnel, clothing, subsistence, travel, death and disability payments. During fiscal year 1972 these forces will be withdrawn and returned to their own country. No required support for these forces from this appropriation has been identified or budgeted at this date for fiscal year 1973.

Chairman ELLENDER. What will be the utilization of the 246 military personnel continued in this activity?

General WHEELER. These marines are assigned to military assistance advisory groups, military mission's, or military assistance activities in 16 countries.

GAINS AND LOSSES BY TYPE OF PERSONNEL

Chairman ELLENDER. At this point in the record there will appear a tabulation of "Gains and losses" by type of officer and enlisted personnel.

(The information follows:)

	Fiscal year—		
	1971	1972	1973
Gains and losses by type for officers:			
Beginning strength	24,941	21,765	19,812
Gains:			
Regulars from academies	124	120	125
Naval Reserve Officer Training Corps/other service ROTC	115	141	152
Other external procurement	1,429	1,390	1,569
Internal USMC sources	215	27	169
Miscellaneous and adjustment	166	177	85
Total	2,059	2,100	2,100
Losses:			
Retirements (over 20)	834	757	770
Other releases and discharges to civilian life	2,856	3,072	1,859
Reversion to enlisted status	1,428	84	6
Miscellaneous and adjustment	117	140	144
Early release	(1,038)	(1,998)	(0)
Separation of career Reserves	(198)	(218)	(0)
Total	5,235	4,053	2,779
End strength	21,765	19,812	19,133
Gains and losses by type for enlisted:			
Beginning strength	234,796	190,604	178,208
Gains:			
Total enlistments	55,925	55,200	54,810
Total volunteers	(55,925)	(55,200)	(54,810)
Male	(54,828)	(54,000)	(53,600)
Female	(1,097)	(1,200)	(1,210)
Inductees	(0)	(0)	(0)
Other gains (includes reenlistments)	14,504	14,641	15,431
Less accounting adjustment	0	2,906	0
Total gains	70,429	66,935	70,241
Losses:			
Separation at expiration of term of service or early release	59,136	56,314	50,801
Early release	(34,835)	(0)	(0)
Retirements (including disability)	4,914	4,270	4,163
Other attrition and miscellaneous losses	50,571	18,747	14,653
Total losses	114,621	79,331	69,617
End-year strength	190,604	178,208	178,832

OFFICER GAINS

Chairman ELLENDER. Of the "Officer gains" I note that 125 will come from the military academies. Are most of these from the Naval Academy or are they spread over the three or four academies?

General WHEELER. They will all come from the Naval Academy.

Senator YOUNG. What does "Other external procurement" include?

General WHEELER. Officer procurement sources included in "Other external procurement" include platoon leaders' classes, both ground and air; officer candidate and aviation officer candidate courses; and the women officer candidate course.

Chairman ELLENDER. Describe "Internal USMC sources."

General WHEELER. New officer gains which come from "Internal USMC sources" are officers who attain commissioned status from our enlisted grades through the following programs: Limited duty officer (LDO); warrant officer (WO); enlisted commissioning program (ECP); and the naval enlisted scientific education program (NESEP).

Senator YOUNG. What is the meaning of "Miscellaneous and adjustment"?

General WHEELER. This entry includes officers who augment into the regular force from an Inactive Reserve status, officers who transfer to the Marine Corps from other services, Inactive Reserve officers and former officers who come on active duty to pursue special work, and Inactive Reserve officers who come on temporary active duty for training and who are paid with "Military personnel, Marine Corps" funds vice "Reserve personnel, Marine Corps," funds. It also includes acounting adjustments required to reconcile reporting system data with actual data.

OFFICER LOSSES

Chairman ELLENDER. Under "Officer losses" there is the item "Reversion to enlisted status." Please describe this item.

General WHEELER. During the Vietnam war the Marine Corps temporarily commissioned staff noncommissioned officers to meet the increased wartime officer requirements. With our reduced Vietnam role and officer strength, these temporarily commissioned officers are being reverted to their permanent enlisted grades.

ENLISTED GAINS

Chairman ELLENDER. What is the "accounting adjustment" for fiscal year 1972 provided in the justifications?

General WHEELER. In September 1971 we changed manpower accounting systems from the "Personnel accounting system" to the "Manpower management system." The accounting adjustment represents losses to our strength due to differences in the data bases of the two systems at the time of the changeover and also further quality control actions on the new data base.

Chairman ELLENDER. According to the tabulation, you do not plan to utilize the draft again in fiscal year 1973. Do you care to comment?

General WHEELER. The Marine Corps has not utilized the draft since February 1970, and we do not plan to use the draft in fiscal year 1973. We achieved 101 percent of our new accessions objective in fiscal year 1971 without taking inductees. Our new accessions requirements in fiscal years 1972 and 1973 are essentially the same as the 1971 requirements.

Senator YOUNG. Do you anticipate any problems in enlisting 54,810 volunteers, male and female, in fiscal year 1973?

General WHEELER. In fiscal year 1971 we recruited nearly 56,000 young men and women without resorting to the draft. Our 1972 quota is approximately the same and we anticipate achieving this quota. We also expect to be able to enlist the numbers we want in 1973. However, our primary concern is the quality of individuals whom we are able to recruit. We have included in this budget request several All Volunteer Force programs including funds for additional recruiters. We need your support for these programs to help us attract the high quality young men and women we need in the Marine Corps.

ENLISTED LOSSES

Chairman ELLENDER. Do you have any comments to make concerning the tabulation of enlisted losses?

General WHEELER. Yes, sir. The largest portion of the nearly 70,000 losses planned for fiscal year 1973 consists of approximately 51,000

marines who will reach their expiration of active service; that is, they will complete their terms of enlistment. However, not all of these marines are separated to civilian life. In 1973 we expect to reenlist 13,400 of these marines, which is the number necessary to sustain our career enlisted force at a constant size. Retirements include three groups of marines; those who have completed 30 years of active service and are retired, those who have completed 20 years of active service and are transferred to the Fleet Marine Corps Reserve, and those who are retired for reasons of disability. The "Other attrition" category includes marines separated for various administrative reasons, such as hardship discharges, or for punitive reasons as a result of a court-martial.

DISTRIBUTION OF MILITARY PERSONNEL BY GEOGRAPHIC AREA

Chairman ELLENDER. At this point there will appear a tabulation from the justifications indicating the distribution of miltary personnel by geographic area.

(The information follows:)

DISTRIBUTION OF MILITARY PERSONNEL BY GEOGRAPHICAL AREA

Region and country	Number of personnel (end strength)		
	Fiscal year 1971	Fiscal year 1972	Fiscal year 1973
Europe and related areas:			
Great Britain	138	138	136
Italy	125	124	124
Spain	126	126	126
Turkey	20	20	20
West Germany	129	123	123
Personnel afloat	2,142	2,105	2,105
Other Europe and related areas	576	576	576
Total Europe and related areas	3,256	3,212	3,210
Western Pacific:			
Japan	6,817	6,241	6,241
South Korea	59	59	58
Philippines	655	672	672
Ryukyu Islands	17,180	15,504	15,504
Taiwan	22	23	23
Personnel afloat	3,323	3,323	3,323
Other Western Pacific	0	0	0
Total Western Pacific	28,056	25,822	25,821
Near East and South Asia	192	192	192
Other Pacific	56	56	56
Western Hemisphere	335	319	319
U.S.S.R. and East Europe	45	45	45
Other personnel afloat	1,269	1,582	1,582
United States, territories, and SEA	179,137	166,769	166,717
Undistributed	0	0	0
Total	181,034	168,963	168,911
Total, personnel distribution	212,346	197,997	197,942
Reimbrusables	23	23	23
Total, personnel by geographical area	212,369	198,020	197,965

MAINTENANCE OF PERSONNEL IN EUROPE AND PACIFIC AREAS

Chairman ELLENDER. In the tabulation of personnel by geographic area on page 3–29 of the justifications. I note that, in comparison with fiscal year 1972, you plan a total reduction of 55 military personnel, of which two will be accredited to Europe and related areas and one

to the western Pacific area. You evidently do not contemplate any real withdrawals from either of those areas. Is that correct?

General WHEELER. Yes, sir; that is correct.

SUMMARY OF MILITARY PERSONNEL BY PRIMARY MISSION

Chairman ELLENDER. Please provide the committee with a tabulation of military personnel by primary mission.

General WHEELER. I'd be happy to, sir.

(The information follows:)

Summary of manpower by major mission and support (fiscal guidance) categories (end strength) fiscal year 1973

	Personnel
Force mission:	
Strategic forces	159
Land forces	78,956
Tactical air forces	27,349
Naval forces	630
Total	107,094
Other mission:	
Intelligence and security	1,802
Research and development	53
Support to other nations	246
Total	2,101
Support:	
Base operating support	19,394
Medical (patients)	745
Individuals	14,965
Training	43,697
Command	8,606
Logistics	1,340
Total	88,747
Total Marine Corps (excluding reimbursables)	197,942

SUMMARY OF REQUIREMENTS BY BUDGET PROGRAM

Chairman ELLENDER. There will also appear in the record a summary of requirements by budget program.

(The information follows:)

PERSONNEL SUMMARY

	Fiscal year—		
	1971 actual	1972 estimate	1973 estimate
Direct program:			
1. Pay and allowance of officers	$325,725	$315,252	$309,394
2. Pay and allowance of enlisted	941,826	1,007,285	1,086,001
4. Subsistence of enlisted personnel	94,910	78,075	74,611
5. Permanent change of station travel	88,999	70,847	65,332
6. Other military personnel costs	10,180	3,927	2,454
Total, direct program	1,461,640	1,475,386	1,537,792
Reimbursable program:			
1. Pay and allowance of officers	428	531	531
2. Pay and allowance of enlisted	1,214	500	500
4. Subsistence of enlisted personnel	9,744	4,969	4,669
5. Permanent change of station travel	509	500	500
Total, reimbursable program	11,895	6,500	6,200
Total obligations	1,473,535	1,481,886	1,543,992

PAY AND ALLOWANCES OF OFFICERS

Chairman ELLENDER. At this point in the record, there will appear the tabulation "Pay and allowances of officers" from the justifications.

(The information follows:)

BUDGET ACTIVITY 1: PAY AND ALLOWANCES OF OFFICERS, SUMMARY BY PROJECTS

[In thousands]

Project	1971 actual	1972 estimate	1973 estimate
A. Basic pay	$247,353	$240,615	$240,620
B. Incentive pay	14,169	14,729	13,957
C. Special pay	3,036	1,288	184
D. Basic allowance for quarters	18,791	22,691	24,514
E. Basic allowance for subsistence	13,379	11,787	11,148
F. Station allowances, overseas	1,251	1,187	1,187
G. Uniform allowances	561	511	548
H. Family separation allowance	1,735	1,071	1,035
I. Separation payments	16,592	13,145	7,390
J. Federal Insurance Contribution Act (FICA)	9,286	8,759	9,342
Total obligations	326,153	315,783	309,925
Reimbursable program	−428	−531	−531
Direct program	325,725	315,252	309,394

SOURCE OF OFFICERS

Chairman ELLENDER. Please provide for the record a tabulation indicating the number of officers by source of procurement for fiscal years 1971, 1972, and 1973.

General WHEELER. I would be happy to do so.

(The information follows:)

PROCUREMENT SOURCES, FISCAL YEARS 1971/72/73

Sources	Fiscal year— 1971	1972	1973
Regulars from Academies	124	120	125
Naval Academy	(121)		
Military Academy	(2)		
Air Force Academy	(1)		
Reserve Officer training course	115	141	152
Naval Reserve officer training course	(114)		
Army/Air Force Reserve officer training course	(1)		
Other external procurement	1,439	1,390	1,569
Platoon leaders' class (ground)	(432)	(357)	(343)
Platoon leaders' class (air)	(248)	(156)	(89)
Officer candidate course	(361)	(479)	(517)
Aviation officer candidate course	(344)	(346)	(570)
Women officer candidate course	(54)	(52)	(50)
Internal USMC sources	215	272	169
Limited duty officer	(16)	(120)	(50)
Warrant officer	(58)	(60)	(60)
Navy enlisted scientific education program	(17)	(12)	(9)
Miscellaneous	166	177	85
Augment inactive Reserve officers	(21)	(108)	(16)
Reserve officer temporary active duty training	(65)	(69)	(69)
Miscellaneous	(80)		
Total	2,059	2,100	2,100

RETENTION OF OFFICERS

Chairman ELLENDER. Also provide a tabulation showing retention by type of accession.

General WHEELER. Our officer retention by type of accession is shown on the following chart.

(The information follows:)

OFFICER RETENTION BY SOURCE ENTRY

Source	Percent retained
Naval Academy	49.3
Platoon leaders' class	17.4
Officer candidate/aviation Officer candidate/women officer training class	29.0
Naval Reserve officer training corps (scholarship)	47.2
Naval Reserve officer training corps (contract)	24.6
Other [1]	48.1

[1] Primarily enlisted source procurement.

BASIC PAY

Chairman ELLENDER. For "basic pay" of officers the fiscal year 1973 request is $240,620,000, almost identical to the $240,615,000 provided for fiscal year 1972. I notice that there has been a reduction in the number but that this has been just about absorbed by the pay increase. Have I stated the situation correctly?

General WHEELER. Yes, sir, that is correct.

Chairman ELLENDER. Are there any comments you wish to make about this budget project?

General WHEELER. Yes, sir. As I mentioned in my statement, the Marine Corps is making considerable officer end strength reductions in fiscal years 1972 and 1973. The effect of this can be observed in the reduced man-years in nearly all grades. This results in a decreased overall cost for officers' basic pay even while the entry level pay has been considerably increased.

INCENTIVE PAY

Chairman ELLENDER. For "Incentive pay" for officers the fiscal year 1973 request is for $13,957,000 as compared with $14,729,000 for fiscal year 1972. Please describe the various types of hazardous duty included in this account.

General WHEELER. The types of hazardous duty included in this account are flying duty, parachute-jumping duty, and demolition duty. The predominate duty, however, is flying duty—Naval aviators and Naval flight officers. Parachute-jumping duty and demolition duty are only a small portion of the total incentive pay for officers.

Senator YOUNG. Are the 28 generals listed as crew members actually crew members?

General WHEELER. Yes, the 28 generals are designated Naval aviators. As they have been designated in excess of 20 years and over 45 years of age they are in category II status; that is, the flight time for pay purposes requirement is waived. Assignment to category II is automatic. Naval aviators assigned to this status may perform operational flying if required by assignment but are not authorized to fly proficiency-type flying.

SPECIAL PAY

Chairman ELLENDER. For "Special pay" for officers the fiscal year 1973 request is for $184,000, a reduction from the $1,288,000 provided for fiscal year 1972. This reduction results from the elimination of the $1,083,000 provided in fiscal year 1972 for "Support of free world forces." Please comment.

General WHEELER. The requirement for the Marine Corps to "Support free world forces" terminates with fiscal year 1972. Therefore, this support was deleted from fiscal year 1973.

BASIC ALLOWANCE FOR QUARTERS

Chairman ELLENDER. For "Basic allowance for quarters" for officers the fiscal year 1973 request is for $24,514,000. The amount provided in fiscal year 1972 was $22,691,000. Please justify this increase.

General WHEELER. The increase in the "Basic allowance for quarters" is attributable to the November 14, 1971, pay which is effective for approximately half of fiscal year 1972 and all of fiscal year 1973.

BASIC ALLOWANCE FOR SUBSISTENCE

Senator YOUNG. For "Basic allowance for subsistence" for officers the fiscal year 1973 request is $11,148,000 as compared with the $11,787,000 provided for fiscal year 1972. Please comment.

General WHEELER. The $639,000 decrease in the "Basic allowance for subsistence" is attributable to the 1,113 man-year decrease for officers from fiscal year 1972 to fiscal year 1973.

STATION ALLOWANCES OVERSEAS

Chairman ELLENDER. For "Station allowances overseas" for officers the fiscal year 1973 request is $1,187,000 as compared with the same amount for fiscal year 1972. Do you have any comments to make about this account?

General WHEELER. These payments seldom vary significantly because the number of officers entitled to receive a station allowance is essentially constant.

UNIFORM ALLOWANCES

Chairman ELLENDER. For "Uniform allowances" for officers for fiscal year 1973 the request is $548,000 as compared with $511,000 for fiscal year 1972. Are there any changes of significance to be brought to the attention of the committee?

General WHEELER. The total accessions remain the same for fiscal year 1972 and fiscal year 1973. The monetary increase of $37,000 in fiscal year 1973 is a result of the procurement source being changed, with an increased number of accessions becoming eligible for the larger initial allowance.

Senator YOUNG. Please distinguish between "procurement from civil life" and the ROTC programs.

General WHEELER. Yes, sir, I would be glad to do so. "Procurement from civil life" includes those officers procured directly through the Officer Candidate Course or the Platoon Leaders Class program. The

"ROTC programs" are the officers procured from the Navy, Army or Air Force ROTC programs.

FAMILY SEPARATION ALLOWANCE

Chairman ELLENDER. For "Family separation allowance" for officers the fiscal year 1973 request is $1,035,000 as compared with the $1,071,000 appropriated in fiscal year 1972. Are there any marked changes in this account worthy of mention?

General WHEELER. There are no marked changes in family separation allowances for officers. The small reduction is attributed to reduced officer man-years overseas where dependents are not authorized.

SEPARATION PAYMENTS

Chairman ELLENDER. For "Separation payments" for officers for fiscal year 1973 request is $7,390,000 as compared with the $13,145,000 provided for fiscal year 1972. I wish you would comment on the reduction in personnel bringing about this lower request.

General WHEELER. The reduction in officer separation payments for fiscal year 1973 is due to a reduced number of separations for that year.

Also, a much greater number of Reserve officers selected for involuntary separation or retirement will be released in fiscal year 1972 than in 1973.

Senator YOUNG. What is the "lump sum readjustment payment" as compared with the "lump sum terminal leave payment"?

General WHEELER. The "lump sum readjustment payment" is paid to Reserve officers who are not eligible for retirement but who have completed at least 5 years continuous active duty immediately preceding involuntary separation. The amount of this payment is 2 months' basic pay per year of service not to exceed 2 years' basic pay or $15,000, whichever is less. The "lump sum terminal leave payment" is for unused accrued leave, not to exceed 60 days, paid to an officer when separated. The amount of this payment is based on the officer's daily rate of basic pay, basic allowance for subsistence, and basic allowance for quarters.

Chairman ELLENDER. May an officer receive more than one type of separation pay?

General WHEELER. No, sir. Lump sum readjustment pay, severance pay—failure of promotion, or severance pay—disability, are the three categories of separation payments available to officers being separated who are not eligible for retirement pay. An officer may receive only one type of "separation pay." Lump sum terminal leave payments paid to officers upon separation for accrued leave are in addition to any other separation payment to which an officer is entitled.

Senator YOUNG. I notice that some of these payments on separation involve substantial amounts. What is the largest amount any officer may receive on separation from the service?

General WHEELER. The maximum lump sum separation payment is $15,000. With the payment for accrued leave it is possible for an officer in the grade of colonel to be paid up to $19,500.

FEDERAL INSURANCE CONTRIBUTION ACT

Chairman ELLENDER. For the "Federal Insurance Contribution Act" Federal contribution for officers the fiscal year 1973 request is $9,342,000 as compared with the $8,759,000 provided in fiscal year 1972. The increase is due to the increase in the rate, is it not?

General WHEELER. Yes sir; partly. The increase is also due to the increase in the basic taxable wage subject to Federal Insurance Contribution Act (FICA) from $7,800 to $9,000, effective January 1, 1972.

PAY AND ALLOWANCES OF ENLISTED PERSONNEL

Chairman ELLENDER. At this point in the record there will appear a tabulation from the justifications entitled "Pay and allowances of enlisted personnel."

(The information follows:)

BUDGET ACTIVITY 2.—PAY AND ALLOWANCES OF ENLISTED PERSONNEL, SUMMARY OF PROJECTS

[In thousands]

Project	1971 actual	1972 estimate	1973 estimate
A. Basic pay	$716,552	$776,769	$844,711
B. Incentive pay	4,750	4,272	3,744
C. Special pay	39,341	13,623	5,943
D. Proficiency pay	4,549	9,349	9,945
E. Reenlistment bonus	20,225	28,996	30,797
F. Basic allowances for quarters	62,498	75,845	84,054
G. Station allowances, overseas	1,849	4,552	4,552
H. Clothing allowances	29,462	26,241	25,730
I. Family separation allowance	4,653	3,294	3,455
J. Separation payments	24,257	25,513	28,614
K. Federal Insurance Contribution Act (FICA)	34,904	39,331	44,956
Total obligations	943,040	1,007,785	1,086,501
Reimbursable program	−1,214	−500	−500
Direct program	941,826	1,007,285	1,086,001

PROMOTION OF ENLISTED PERSONNEL

Chairman ELLENDER. I wish you would provide a tabulation showing promotion of enlisted personnel for fiscal years 1971, 1972 and 1973.

General WHEELER. I will be glad to do so.

(The information follows:)

PROMOTIONS

Promotion to—	Fiscal year—		
	1971	1972	1973
Master gunnery sergeant/sergeant major, E-9	516	401	178
Master sergeant/1st sergeant, E-8	504	1,107	970
Gunnery sergeant, E-7	757	1,974	2,101
Staff sergeant, E-6	927	2,079	3,384
Sergeant, E-5	10,252	8,285	10,302
Corporal, E-4	26,000	29,008	24,625
Lance corporal, E-3	42,796	37,153	38,292
Private 1st class, E-2	38,218	48,417	47,292

BASIC PAY

Chairman ELLENDER. For "Basic pay for enlisted personnel" the fiscal year 1973 request is for $844,711,000 as compared with the fiscal year 1972 appropriation of $776,769,000. Please comment on the reduction in number and increase in rates.

General WHEELER. The dollars requested for basic pay are based upon the man-years planned for enlisted personnel in that year. In fiscal year 1973 our strength will be essentially level and man-years required are very close to the end strength. In fiscal year 1972 our strength is declining from the higher end 1971 level and the number of man-years required is larger than in 1973. The increase in rates is the result of two pay raises passed by this Congress in Public Law 92–129 and Public Law 92–204. These higher rates are in effect for only part of the year in 1972 but for all of the year 1973 resulting in a higher average rate in fiscal year 1973.

Chairman ELLENDER. I notice a consistent reduction in the number of enlisted personnel in the upper grades as contrasted with an increase in the numbers assigned to E–1's and E–2's. Does this change result from an effort on the part of the Marine Corps or is it the result of a loss of personnel whom the Marine Corps would have liked to retain?

General WHEELER. This change is the result of deliberate action on the part of the Marine Corps and is not associated with retention. The reason for this action is to more closely aline our enlisted grade distribution with requirements while also recognizing the increased cost of manpower. This action has decreased the average grade of the enlisted force resulting in a significant cost avoidance both now and in future years while at the same time maintaining reasonable promotion flow.

Chairman ELLENDER. Will this have any effect on the readiness of the Marine Corps?

General WHEELER. This will not have any adverse effect on the readiness of the Marine Corps because it simply brings our grade distribution in line with requirements.

Chairman ELLENDER. For "Incentive pay for enlisted personnel" the fiscal year 1973 request is for $3,744,000 as compared with $4,272,000 provided for fiscal year 1972. There is a substantial decrease in the number of personnel receiving flight pay. What if any effect will this have on your combat capability?

General WHEELER. The decrease in the number of enlisted personnel receiving flight pay will not have an adverse effect on our combat capability. The Marine Corps will continue to be a force in readiness. The decrease is attributable to two factors (1) the withdrawal of units from combat operations and (2) the reduction in the personnel strength of the Marine Corps. For example, helicopter door gunners are not required in peacetime operations.

Chairman ELLENDER. Do you have any other comments to make about this budget account?

General WHEELER. The number of personnel receiving flight pay changes from year to year as the Marine Corps personnel strength and aircraft inventory change.

SPECIAL PAY

Senator YOUNG. For "Special pay for enlisted personnel" the fiscal year 1973 request is for $5,943,000. The fiscal year 1972 appropriation was $13,623,000. Please discuss this reduction, including the elimination of the support of free world forces, as well as at "certain locations."

General WHEELER. The reduction in funds requested for special pay is primarily the result of the elimination of support for free world forces which is due to the redeployment of allied forces from the Republic of Vietnam during fiscal year 1972. Funds requested for duty at certain locations are to pay foreign duty pay to personnel stationed overseas. Although the strength overseas at end fiscal years 1972 and 1973 are essentially the same, the man-years in 1972 are greater because this is still a phasedown year from the Southeast Asia buildup. Funds requested are, of course, based on man-years.

PROFICIENCY PAY

Chairman ELLENDER. For "Proficiency pay for enlisted personnel" the fiscal year 1973 request is for $9,945,000, as compared with $9,349,000 for fiscal year 1972. Please justify the increase in the request.

General WHEEELER. The fiscal year 1973 increase of $596,000 over the fiscal year 1972 program consists of increases in two of the Marine Corps proficiency pay programs.

The first is an increase of $394,000 in shortage specialty pay. This increase was necessitated by an increase in the number of critical skills in the Marine Corps that are experiencing low career manning levels. In fiscal year 1973, 20 military occupational specialities appeared on the shortage specialty pay eligibility list for the first time. This increase in the number of eligible skills resulted in the fiscal year 1973 increase.

The second increase resulted from the expanded special duty assignment pay program. While no new categories were added, the increased emphasis on recruiting has resulted in additional numbers of personnel being added to the eligibility lists. This addition of personnel amounted to a $202,000 increase in the fiscal year 1973 program. The increased emphasis on recruiting is considered necessary in preparing for a zero draft environment.

Senator YOUNG. Please speak to the phasing out of specialty pay.

General WHEELER. Shortage specialty pay is paid to careerists in designated critical skills which are experiencing reduced career manning levels. Since the award is made to all career personnel in the designated critical skill, a large portion of the funding is spent paying career personnel who have already decided to make the service a career. In other words, the major impact of the program is not being applied at the critical decision point in a Marine's career, (that is, the reenlistment decision point) but is spread throughout the entire length of his careerist years. Therefore, Marines who have already decided to remain in the service continue to receive the award as long as their skill remains on the eligibility list.

The Quadrennial Review of Military Pay Study Group has proposed a selective reenlistment bonus to take the place of the reenlistment bonus, variable reenlistment bonus and shortage specialty pay programs. This group cites the above information as basis for the belief that the bonus system of career incentives is economically far superior to that of the proficiency pay concept and has therefore made the proprosal that shortage specialty pay be phased out of the incentives program.

The selective reenlistment bonus concept would place major emphasis at the serviceman's reenlistment decision point by offering substantially larger bonuses than the present program. If the program is effective and the serviceman decides to remain on active duty, the cost of attracting him is a one-time cost. If the man decides not to reenlist, the payment is not made but remains to be offered to another man at his critical reenlistment decision point.

REENLISTMENT BONUS

Chairman ELLENDER. For the "Reenlistment bonus for enlisted personnel" the fiscal year 1973 request is for $30,797,000 as compared with the appropriation for fiscal year 1972 of $28,996,000. Please indicate the nature of this increase.

General WHEELER. The increase in the funds requested is due to the fact that we expect to reenlist more marines in fiscal year 1973 as the full impact of Project Volunteer programs is felt.

Senator YOUNG. How do you prognosticate the requirement for increased numbers in such categories?

General WHEELER. The number of reenlistments required in any year is that number which is necessary to sustain the career force at a constant size. That is, we must replace each loss from the career force with a reenlistment. In 1973 we project slightly more losses from the career force than in 1972.

BASIC ALLOWANCE FOR QUARTERS

Chairman ELLENDER. For "Basic allowance for quarters" of enlisted personnel the fiscal year 1973 request is for $84,054,000 as compared with the fiscal year 1972 appropriation of $75,845,000. Please explain the reasons for this increase.

General WHEELER. The $8.2 million increase in fiscal year 1973 over fiscal year 1972 is due to the pay increase being in effect for a full year in fiscal year 1973 versus approximately a half year in fiscal 1972.

Chairman ELLENDER. I note a steady increase in the rate for substandard family housing, the average rate for 1973 being $340.93. Please comment on this, indicating how this rate is arrived at.

General WHEELER. The steady increase in the substandard family housing rate is due to the pay raise being in effect for a full year in fiscal year 1973 versus approximately a half year in fiscal year 1972 and no effect in fiscal year 1971. The substandard quarters rate is computed at 25 percent of the individual's basic allowance for quarters with dependents rate.

STATION ALLOWANCES, OVERSEAS

Chairman ELLENDER. For "Station allowances, overseas" for enlisted personnel the fiscal year 1973 request is for $4,552,000, a figure identical to the amount provided for fiscal year 1972. Do you have any comment on this project?

General WHEELER. The funds requested for fiscal year 1973 are identical to the fiscal year 1972 request because there are no changes planned in the number of personnel assigned to those overseas locations which qualify for these allowances.

CLOTHING ALLOWANCE

Chairman ELLENDER. For the "Clothing allowance" for enlisted personnel, the fiscal year 1973 request is for $25,730,000, as compared with $26,241,000 for fiscal year 1972. Please comment.

General WHEELER. The monetary reduction is a result of the planned procurement of less recruits during fiscal year 1973 and the reduction of total enlisted man-years, resulting in a decrease for basic and standard maintenance allowances. Supplementary allowances have also been reduced due to less Navy corpsmen in support of combat forces and the stabilization of the assignment of recruiting personnel in comparison with fiscal year 1972.

Senator YOUNG. I note that there is a civilian clothing allowance for 397 personnel budgeted for fiscal year 1973. For whom is this?

General WHEELER. The initial civilian clothing monetary allowance is prescribed in each individual case by the Commandant of the Marine Corps within limitations prescribed by the Secretary of Defense. It is authorized only for specific duty assignments where the wearing of civilian clothes is required. The allowance that is furnished enlisted personnel is considered as an extra clothing allowance and is furnished in addition to other clothing allowances to which an individual may be entitled. Specific examples are criminal investigators, counterintelligence personnel, and marines assigned where the host country has requested the wearing of civilian clothing.

Chairman ELLENDER. What is the difference between the "large blue uniform, male" and the "small blue uniform, male"?

General WHEELER. The difference here is the amount of issue of certain items of the blue uniform. The significant item being two blue coats per issue with the large blue uniform, vice one blue coat per issue with the small blue uniform.

Chairman ELLENDER. I note that $99,000 is budgeted for uniforms to be worn overseas at State Department offices. Please explain.

General WHEELER. The Department of Defense has authorized a $182 maximum supplemental uniform clothing allowance to marines assigned duty with the foreign establishment of the State Department. This allowance normally includes the blue uniform with extra white items, plus other supplemental uniform items appropriate to the location to which the individual is assigned.

Chairman ELLENDER. What is the item for the Presidential helicopter?

General WHEELER. The enlisted personnel assigned to Marine Helicopter Squadron 1, Marine Corps Air Station, Quantico, who perform special duties directly involved with the air transportation of the President of the United States and his official parties, distinguished persons of the Government, and high ranking foreign armed services personnel, are authorized an allowance not to exceed $97 for the purchase of supplementary items of uniform of the type and quantity determined by the command. This allowance normally includes a small blue uniform plus two tropical khaki shirts.

MILITARY SEPARATION ALLOWANCE

Chairman ELLENDER. For the "Family separation allowance" for fiscal year 1973, the fiscal year 1973 request is for $3,455,000 as compared with $3,294,000 for fiscal year 1972. What occasions the increase in the number of such entitlements?

General WHEELER. The family separation allowance is paid only to marines with dependents, when they are separated from these dependents for more than 30 days due to military orders. Although the number of marines stationed overseas or aboard ship does not change significantly from 1972 to 1973, the number of marines who are married and have dependents has been increasing. Therefore, we expect the number who qualify for the allowance in fiscal year 1973 to be greater than in 1972.

SEPARATION PAYMENTS

Chairman ELLENDER. For "Separation payments" for fiscal year 1973, the request is for $28,614,000 as compared with $25,513,000 for fiscal year 1972. Please comment on the large increase in base pay lump sum terminal leave payments.

General WHEELER. The number of these payments actually decreases in 1973. However, the average rate of each payment increases because of the recent pay raises which are in effect for a full year in 1973, vice only a partial year in 1972.

Senator YOUNG. Describe the authorized donations.

General WHEELER. A gratuity of up to $25 is paid to marines discharged with a dishonorable discharge, bad conduct discharge, or one of several types of undesirable discharges. The marine is paid the difference between his personal funds on hand, excluding funds for transportation, and $25 as pocket money to get him home.

FEDERAL INSURANCE CONTRIBUTION ACT

Chairman ELLENDER. For "Federal Insurance Contribution Act," the fiscal year 1973 request is for $44,956,000 as compared with the $39,331,000 provided in fiscal year 1972. Please justify the increase.

General WHEELER. This increase is due to the increase in the basic taxable wage subject to Federal Insurance Contribution Act (FICA), from $7,800 to $9,000, effective January 1, 1972, and also due to the increase of the Federal Insurance Contribution Act (FICA) rate itself from 5.2 percent to 5.65 percent, effective January 1, 1973.

PAY AND ALLOWANCES OF CADETS

Chairman ELLENDER. For the past several years, there has been no appropriation request for "Pay and allowances of cadets." For the sake of the record, I wish that you would indicate the reason for this.

General WHEELER. The Marine Corps has been able to meet the majority of its pilot procurement requirement from civilian college graduates, with minor additional input from the enlisted commissioning program. Accordingly, the Marine Corps has temporarily suspended the Marine Corps cadet program.

SUBSISTENCE OF ENLISTED PERSONNEL

Chairman ELLENDER. At this point in the record, there will appear a summary of requirements by project for "Subsistence of enlisted personnel."

(The information follows:)

BUDGET ACTIVITY 4.—SUSBISTENCE OF ENLISTED PERSONNEL, SUMMARY, BY PROJECTS

[In thousands]

Project	1971 actual	1972 estimate	1973 estimate
A. Basic allowance for subsistence	$29,949	$28,997	$28,716
B. Subsistence in kind	74,705	54,047	50,564
Total obligations	104,654	83,044	79,280
Reimbursable program	−9,744	−4,969	−4,669
Direct program	94,910	78,075	74,611

BASIC ALLOWANCE FOR SUBSISTENCE

Chairman ELLENDER. For "Basic allowance for subsistence" the fiscal year 1973 request is for $28,716,000, as compared with $28,997,000 for fiscal year 1972. Are there any changes of substance in this project?

General WHEELER. No, sir; there are not.

Senator YOUNG. I note in the justifications a reference to the "safety level." Please explain this for the record.

General WHEELER. Safety level represents the packaged rations that are maintained to meet the subsistence requirements of the Fleet Marine Forces in the event of commitment. This safety level remains in the warehouse for 1 year, is then rotated to the operational and training level, and is consumed on maneuvers and scheduled exercises. In this way, it is possible to maintain, at all times, readiness requirements, without suffering storage losses. With an estimated shelf life of 3 years, these rations must be rotated into use on a strict schedule, and their consumption is an economic measure. The estimated consumption of operational rations is deducted from the subsistence in messes requirements.

Chairman ELLENDER. Please explain the change in accounting procedures initiated in fiscal year 1972.

General WHEELER. In fiscal year 1972, for the first time, the billing of the parent service for feeding of its military personnel by another

service was abolished; and all services, based on exchange of personnel data, budgeted for and will feed all military personnel (exclusive of reserves) messing in their facilities. The numbers of personnel from other services are shown on the personnel statistics page for subsistence in kind, as are the marines fed by other services.

SUBSISTENCE IN KIND

Chairman ELLENDER. For "Subsistence in kind" for fiscal year 1973 the request is for $50,564,000 as compared with the fiscal year 1972 appropriation of $54,047,000. Please define for the record the difference between "Subsistence in kind" and "Basic allowance for subsistence."

General WHEELER. Subsistence in kind is the actual ration given to an individual. Basic allowance for subsistence is cash given an individual in certain circumstances in lieu of food or rations.

Senator YOUNG. Generally speaking, why is it that the request for the basic allowance for subsistence remains relatively constant and the request for subsistence in kind shows some reduction?

General WHEELER. It was estimated that about the same number of personnel would be authorized to mess separately and be on leave in fiscal year 1973 as in fiscal year 1972. The reduction in subsistence in kind was due in the most part to the $3,200,000 in discontinued subsistence support of free world forces.

Chairman ELLENDER. What are "Surplus operational rations"?

General WHEELER. In fiscal year 1971 the Marine Corps withdrew from the combat zone and found itself with more operational rations than were required. These rations were sold back to the Defense Personnel Support Center. The funds then were used to support other subsistence requirements thereby reducing the direct program side of the budget.

MESS ATTENDANTS

Chairman ELLENDER. Describe what the Marine Corps does in regard to the cooks, bakers, and mess attendants, both in training areas and in the field. Do you employ civilians?

General WHEELER. The majority of the cooks and bakers required to support the food service program are school-trained marines. They train for both garrison and field food preparation. The Marine Corps does not operate garrison bakeries for production of fresh bread. All breads for garrison messes are purchased from local civilian bakeries; however, we do operate field baking equipment while units are operating in the field. The mess attendants required to support the Marine Corps food service program consist primarily of marines in the grades of private through lance corporal being assigned to mess duty for a period of 30 to 90 days each year. Normally, junior marines serve only 30 days of mess duty per year. We use civilian mess attendants at several activities, but we have only three commands at which mess attendants are predominantly civilians: they are Marine Corps Supply Center, Albany, Ga.; Marine Corps Air Station, Iwakuni, Japan; and Marine Corps Base, Camp Smedley D. Butler, Okinawa. Civilian mess attendants can be employed in garrison messes throughout the Marine Corps if ceiling and funds for either civilian salaries or con-

tract operations are available. We're currently phasing in a program that will eventually provide for total civilization of mess attendants in garrison messes.

PERMANENT CHANGE OF STATION TRAVEL

Chairman ELLENDER. At this point in the record there will appear a summary of requirements by project of "Permanent change of station travel."

(The information follows:)

BUDGET ACTIVITY 5.—PERMANENT CHANGE OF STATION TRAVEL, SUMMARY, BY PROJECT

[In thousands]

	1971 actual	1972 estimate	1973 estimate
A. Accession travel	$12,329	$12,058	$12,006
B. Training travel	1,519	1,227	2,108
C. Operational travel between duty stations	8,107	7,201	7,807
D. Rotation travel to and from overseas	53,113	39,201	33,929
E. Sepatation travel	14,440	11,660	9,982
Total obligations	89,508	71,347	65,832
Reimbursable program	−509	−500	−500
Direct program	88,999.	70,847	65,332

ACCESSION TRAVEL

Chairman ELLENDER. For "Accession travel" the fiscal year 1973 request is for $12,006,000 as compared with a total appropriation of $12,058,000 for fiscal year 1972. Is there any change of significance in this request?

General WHEELER. No sir, there is no significant change. The slight decrease in planned accession travel movements during fiscal year 1973 results in the reduced request for fiscal year 1973.

Chairman ELLENDER. The rate for officers travel is $239.99 and that for enlisted personnel is $95.58. Explain the reason for the difference.

General WHEELER. The accession travel rate of $239,99 for officers includes substantial amounts of per diem which do not affect the enlisted rate of $95.58.

Senator YOUNG. The rate for the travel of dependents is the same for both dependents of officers and enlisted personnel, but the rate for the transportation of household goods is less for officers than for enlisted personnel. Please explain.

General WHEELER. The only enlisted personnel entitled to dependents travel and transportation of household goods in the accession travel category are former marines who have previously been separated and later reenlist and by virtue of rank and service are entitled to these allowances. Therefore, the enlisted accessions are not entry level marines whereas the officers are. The rate for the transportation of household goods for the enlisted personnel in this category is greater than that of the officers due to greater weight having been accumulated and shipped. The rate for the dependents travel is the same for officer and enlisted based on the actual expenditure history reflecting payment for miles traveled by dependents.

Chairman ELLENDER. I note that there is a dislocation allowance of $142 for officers and none for enlisted personnel. What is the reasoning behind that?

General WHEELER. Payment of dislocation allowance may not be made from home or place of enlistment to the first permanent duty station. Officers being transferred from the basic school have already been at their first permanent duty station and are thereby entitled to dislocation allowance. Enlisted personnel in the accession travel category have not reached their first permanent duty station and are not entitled to receive dislocation allowance.

TRAINING TRAVEL

Chairman ELLENDER. For "Training travel" the fiscal year 1973 request is for $2,108,000 as compared with $1,227,000 for fiscal year 1972. Please explain this increase.

General WHEELER. The increased request for fiscal year 1973 is based on increased training travel moves. Increased input to various training programs, some of which had been deferred during the Vietnam commitment have resulted in increased training travel moves.

OPERATIONAL TRAVEL

Chairman ELLENDER. For "Operational travel" for fiscal year 1973 the request is for $7,807,000 as compared with $7,201,000 for fiscal year 1972. I note that you anticipate lower costs for officers' "Operational travel" but higher costs for enlisted personnel. Please indicate the reason for that.

General WHEELER. The decrease in officer "Operational travel" in fiscal year 1973 results from a planned decrease in operational moves which relates to the decreased officer strength, whereas increased movements in enlisted operational travel results from increased immediate reenlistments, greater enlisted strength and to new mileage tables.

ROTATION TRAVEL TO AND FROM OVERSEAS

Chairman ELLENDER. For "Rotation travel to and from overseas" the fiscal year 1973 request is for $33,929,000 as compared with $39,201,000 for fiscal year 1972. Please speak to the changes in this project.

General WHEELER. Fiscal year 1972 numbers were high because moves associated wtih redeployment from RVN at the end of fiscal year 1971 were not completed until the beginning of fiscal year 1972. The strength in Hawaii was increased in fiscal year 1972, but is level in fiscal year 1973, so relatively few personnel will perform rotation travel to and from there in fiscal year 1973. The rate increase is due to new mileage tables.

SEPARATION TRAVEL

Chairman ELLENDER. For "Separation travel" for fiscal year 1973 the request is $9,982,000 as compared with $11,660,000 for fiscal year 1972. Please comment.

General WHEELER. The reduction in the fiscal year 1973 separation travel request is based on a planned reduction in separations during fiscal year 1973.

OTHER MILITARY PERSONNEL COSTS

Chairman ELLENDER. At this point in the record there will appear a summary of requirements by project of "Other military personnel costs."

(The information follows:)

BUDGET ACTIVITY 6: OTHER MILITARY PERSONNEL COSTS—SUMMARY, BY PRODUCTS

[In thousands of dollars]

Project	1971 actual	1972 estimate	1973 estimate
A. Apprehension of military deserters, absentees, and escaped military prisoners	1,400	500	500
B. Interest on uniformed services saving deposits	700	500	500
C. Payment of death gratuities	3,204	2,294	1,027
D. Servicemen's group life insurance program	4,876	633	427
Total obligations	10,180	3,927	2,454
Reimbursable program	0	0	0
Direct program	10,180	3,927	2,454

APPREHENSION OF MILITARY DESERTERS

Chairman ELLENDER. For "Apprehension of military deserters, absentees and escaped military prisoners" the fiscal year 1973 request is for $500,000, the same as the amount provided for fiscal year 1972. Is there anything of significance to bring to the attention of the committee in regard to this item?

General WHEELER. Yes, sir; although a lesser number of guards will be required for this purpose in fiscal year 1973, the increased travel costs for guards has kept this item from being reduced.

INTEREST ON UNIFORMED SERVICES SAVINGS DEPOSITS

Senator YOUNG. For "Interest on uniformed services savings deposits" the fiscal year 1973 request is for $500,000, also the same as the amount provided last year. Do you have any comment?

General WHEELER. Yes, sir; this program is only available to personnel stationed in a foreign country and with our overseas strength fairly constant in 1972 and 1973 the interest due estimate remains the same in both fiscal years.

PAYMENT OF DEATH GRATUITIES

Chairman ELLENDER. For the third item, "Payment of death gratuities" the fiscal year 1973 request is for $1,027,000, as compared with the $2,294,000 provided for fiscal year 1972. Please comment on the enlisted reduction.

General WHEELER. The reduction of 45 deaths for enlisted personnel is attributable to the decrease in enlisted manyears for fiscal year 1972. The large dollar reduction is based on the discontinued support of free world forces.

SERVICEMEN'S GROUP LIFE INSURANCE PROGRAM

Chairman ELLENDER. For the "Servicemen's group life insurance program" the fiscal year 1973 request is for $427,000, a reduction from the amount provided for fiscal year 1972 of $633,000. Do you have any comment?

General WHEELER. Yes, sir; a minimal amount was estimated in this budget to offset variations similar to that which occurred in fiscal year 1972 but to a lesser degree.

SPECIAL ANALYSES

Chairman ELLENDER. The justifications included a section entitled "Special Analyses." The information contained in that section will be included in the record at this point.

(The information follows:)

SPECIAL ANALYSES (STRENGTHS IN WHOLE NUMBERS)

	Fiscal years—		
	1971	1972	1973
A. MILITARY PERSONNEL ASSIGNED TO TELECOMMUNICATIONS FUNCTIONS			
Officers	80	86	86
Enlisted	688	693	693
Total	768	779	779
B. MILITARY PERSONNEL ASSIGNED TO AUTOMATIC DATA PROCESSING ACTIVITIES			
Officers	207	208	212
Enlisted	1,657	1,665	1,742
Total	1,864	1,873	1,954
C. MILITARY PERSONNEL ASSIGNED TO INTELLIGENCE ACTIVITIES [1]			
Officers	188	196	193
Enlisted	1,901	2,070	2,071
Total	[2] 2,089	2,266	2,264

See footnotes at end of table, p. 213.

D. MILITARY PERSONNEL ASSIGNED TO HEADQUARTERS ACTIVITIES (STRENGTHS IN WHOLE NUMBERS)

	Fiscal year 1971 actual					Fiscal year 1972 estimate					Fiscal year 1973 estimate				
	End strength			Civilian		End strength			Civilian		End strength			Civilian	
	Officers	Enlisted	Total	ES	Total	Officers	Enlisted	Total	ES	Total	Officers	Enlisted	Total	ES	Total
Departmental administration:															
Secretary of the Navy	32	13	45			30	13	43			30	13	43		
Chief of Naval Operations	26	3	29			25	3	28			25	3	28		
Naval Material Command	4		4			4		4			4		4		
Naval Security Group	9	10	19			9	13	22			9	13	22		
Naval Intelligence Command	1		1			1		1			1		1		
Naval Communication Command	1		1			1		1			1		1		
Headquarters, U.S. Marine Corps	725	544	1,269	1,073	1,073	693	453	1,146	1,049	1,049	690	451	1,141	1,049	1,049
Total, departmental	798	570	1,368	1,073	1,073	763	482	1,245	1,049	1,049	760	480	1,240	1,049	1,049
Systems Command:															
Naval air	27		27			26		26			26		26		
Naval Ordnance	2		2			2		2			2		2		
Office of Naval Research	1		1			1		1			1		1		
Naval electronics	6		6			6		6			6		6		
Naval ship	1		1			1		1			1		1		
Total, systems commands	37		37			36		36			36		36		
Major commands:															
Commander in chief, Atlantic	4	5	9			3	5	8			3	5	8		
Commander in chief, Pacific	10	11	21			10	9	19			10	9	19		
Commander in chief, U.S. Naval Forces, Europe	4	4	8			5	5	10			5	5	10		
Chief of Naval Air Reserve Training Command		1	1				1	1				1	1		
Chief of Naval Air Training Command	3	2	5			3	2	5			3	2	5		
Naval district commandants	7	1	8			6	1	7			6	1	7		
Total, major commands	28	24	52			27	23	50			27	23	52		
Unified and specified commands:															
Alaskan Command	1		1			1		1			1		1		
Atlantic Command [3]	14	6	20			13	5	18			13	5	18		
European Command	20	8	28			18	6	24			18	6	24		
Pacific Command [3]	32	23	55			38	25	63			38	25	63		

U.S. Southern Command	2		2			5		5			5		5		
U.S. Strike Command	8	7	15			4	1	5			4	1	5		
Headquarters, NORAD/CONAD	3	1	4			3	1	4			3	1	4		
Total, unified and specified commands	80	45	125			82	38	120			82	38	120		
Total, headquarters activities	943	639	1,582	1,073	1,073	908	543	1,451	1,049	1,049	905	541	1,446	1,049	1,049

E. MILITARY PERSONNEL ASSIGNED TO ACTIVITIES OUTSIDE THE MILITARY SERVICE (STRENGTHS IN WHOLE NUMBERS)

Other Department of Defense activities:															
Office of the Secretary of Defense	27	5	32			31	6	37			28	7	35		
Joint Chiefs of Staff	51	11	62			57	13	70			45	18	72		
Defense Communications Agency [4]	30	18	48			30	22	52			26	21	47		
Defense Nuclear Agency	10	5	15			8	4	12			5	1	6		
Defense Intelligence Agency [5]	38	11	49			38	11	49			35	10	45		
Defense Supply Agency	29		29			34	1	35			34	1	35		
National Security Agency	28	431	459			30	441	471			30	441	471		
Total, Department of Defense activities	213	481	694			228	498	726			212	499	711		
Other Government agencies (reimbursable):															
Federal Aviation Agency	1		1			1		1			1		1		
Selective Service System	8		8			8		8			8		8		
National Aeronautics and Space Administration	5		5			5		5			5		5		
Central Intelligence Agency	6	2	8			7	2	9			7	2	9		
Arms Control Agency	1		1												
Total, other Government agencies	21	2	23			21	2	23			21	2	23		
Other Government agencies (nonreimbursable):															
State Department	21	1,006	1,027			21	1,006	1,027			21	1,088	1,109		
Offices of the President and Vice President of the United States	2	1	3			2		2			2		2		
Marine Helicopter Squadron 1	5	10	15			5	10	15			5	10	15		
Federal Aviation Agency (west and south regions)	2		2			2		2			2		2		
Total, other Government agencies (nonreimbursable)	30	1,017	1,047			30	1,016	1,046			30	1,098	1,128		
Total, military personnel assigned to activity outside the military service	264	1,500	1,764			279	1,516	1,795			263	1,599	1,862		

[1] Combination of consolidated cryptologic program and the general defense intelligence program.
[2] Does not include 180 students which were reported in specialized training 81112M.
[3] Includes marines assigned to Navy missions.
[4] Personnel also shown in telecommunications special analysis.
[5] Personnel also shown in intelligence activities special analysis

AUTOMATIC DATA PROCESSING PERSONNEL

Chairman ELLENDER. I noted on the tabulation marked "Special analyses" under "Military personnel assigned to automatic data processing activities" that you plan to increase the number of personnel so engaged from 1,873 in 1972 to 1,954 in 1973. Please justify this increase.

General WHEELER. There are a total of 212 officers and 1,742 enlisted marines required in fiscal year 1973 for automated data processing functions for the Marine Corps. The increase over fiscal year 1972 requirements results from the installation of two third generation force information system computers and the requirement to continue parallel operations of second genertaion equipment during the phase-in period.

In addition, four marines, one officer, and three enlisted assigned to Navy ADP programs were inadvertently omitted from the "Special analyses" tabulation for fiscal years 1972 and 1973.

INTELLIGENCE ACTIVITIES

Chairman ELLENDER. I also note that the number of enlisted personnel engaged in intelligence activities is listed at 2,071. What are the functions of these personnel?

General WHEELER. The manpower programed for intelligence may be categorized as either for intelligence activities in direct response to internal Marine Corps requirements or resources needed to support activities external to the Marine Corps which represent a portion of overall Department of Defense manpower provided to support these activities.

Manpower in support of Marine Corps intelligence requirements provides tactical special intelligence support to the Fleet Marine Forces and special intelligence communications for Headquarters Marine Corps. A total of 971 enlisted are programed in fiscal year 1973 for these purposes, and an additional 180 spaces are programed for training personnel to fill these spaces.

The intelligence billets in activities and agencies external to the Marine Corps provide a rotation base and a source of extremely valuable experience for marines in this field. The activities and the enlisted manpower programed to support them in fiscal year 1973 are listed as follows:

	Enlisted
Naval Security Group	617
Classified collection operations	2
Atlantic command electronics intelligence	2
Navy fleet intelligence centers	26
Naval investigative service	2
National Security Agency	76
Defense Intelligence Agency	9
Defense attaché system	1
Total	735

Although it is not directly an intelligence unit, the Marine Barracks, Fort Meade, Md., which provides physical security to the National Security Agency, is considered a part of the intelligence program. The barracks employs 365 enlisted men in this security function.

PERSONNEL ASSIGNED TO AGENCIES OUTSIDE MILITARY SERVICE

Senator YOUNG. Of the 1,862 military personnel assigned to activities outside the military service, would you say that any are assigned to essentially civilian agencies?

General WHEELER. Yes, sir; of that total, 1,136 are assigned to essentially civilian agencies. They are assigned as follows:

State Department	1,109
Federal Aviation Administration	3
Selective Service System	8
Central Intelligence Agency	9
National Aeronautics and Space Administration	5
Office of the President and Vice President	2

Senator YOUNG. Most of these personnel are enlisted personnel. Please describe generally their functions.

General WHEELER. Of the 1,558 enlisted marines, 1,088 are serving with the State Department as embassy guards. The National Security Agency has 365 marines performing security functions and another 76 in operational billets. The remaining 70 enlisted marines fill liaison, staff, and operational billets with other agencies as shown on page 3–81 of the "Military personnel, Marine Corps," budget.

MILITARY MISSION PERSONNEL

Chairman ELLENDER. Please indicate the number of military mission personnel you are budgeting for in fiscal year 1973 and the total cost of such.

General WHEELER. In fiscal year 1973 there will be 246 marines assigned to military assistance advisory groups, missions, and other military assistance command activities. The total U.S. Marine Corps personnel cost for these marines in fiscal year 1973 will be $3,124,000.

FORCE STRUCTURE CHANGES

Senator YOUNG. Have there been any major force structure changes in the past year?

General WHEELER. Yes, sir, there have been some force structure changes during fiscal year 1972. As far as our ground forces are concerned, we deactivated some units which we'd originally activated because of the Vietnam war. These units consisted of a self-propelled 8-inch howitzer battery, a military police battalion, and a detachment from a communications battalion. In addition, by the end of fiscal year 1972 we'll have phased out three flame-tank platoons and three engineer-type amphibious tractor platoons. In aviation forces, we've done, or plan to do, considerable restructuring during fiscal year 1972. Included in these restructure actions are the deactivation of an air control squadron, a fighter-attack squadron, and an all-weather attack squadron. Also included are the activation of a light helicopter squadron and a helicopter gunship squadron. These changes and some other consolidations will result in a net reduction of 154 aircraft in our inventory.

Senator YOUNG. Do you contemplate any in fiscal year 1973?

General WHEELER. No, sir, we don't. We anticipate fiscal year 1972 being the last phasedown year and fiscal year 1973 being a year of relative stability.

CHANGES IN PERSONNEL STRENGTH

Chairman ELLENDER. As you have in the past, would you please provide the committee with a step-by-step tabulation of all major changes in personnel strength in the past year?

General WHEELER. I would be glad to.

(The information follows:)

MARINE CORPS STRENGTH, FISCAL YEAR 1972

Month	End of the month strength	
	Actual	Projected
July	211,305	
August	208,935	
September	204,738	
October	203,856	
November	202,658	
December	198,579	
January	[1] 197,710	
February	[1] 197,772	
March		197,834
April		197,896
May		197,958
June		198,020

[1] These are estimated strengths. The accounting system has not completed the report for these months.

SERVICE REQUEST FOR 1973

Chairman ELLENDER. Please provide the committee with a statement describing the original request made by the department for fiscal year 1973 for this appropriation together with any guidelines preimposed.

General WHEELER. During the Secretary of Defense budget review the funding request of $1,468 million submitted by the Marine Corps was decreased by $11 million net based on reduced subsistence rates and increased absenteeism rates, reduced servicemen's group life insurance rates, increased time in grade, a reduction in the marriage factor of enlisted personnel, a reduction in the number of proficiency pay payments, and a reduction in station allowances overseas payments. After these reductions had been made the pay raise amendment added $80,792,000. This brought the total requirement to the figure of $1,537,792,000, which is now before the committee.

PAY ACT INCREASES

Chairman ELLENDER. Would you please provide a tabulation that will indicate the effective date and cost of all pay act increases in fiscal years 1971, 1972, and 1973?

General WHEELER. Yes, sir; the tabulation follows:

(The tabulation follows:)

[In thousands]

Date of pay raise	Fiscal year— 1971	1972	1973
Jan. 1, 1971	$41,108	$73,610	(1)
Nov. 14, 1971	0	2 128,245	$205,708
Jan. 1, 1972	0	41,686	80,792

1 Not computed in the 3d affected year.
2 $27,095 of this amount was absorbed by the Marine Corps.

FLIGHT WAIVER PROVISION

Senator YOUNG. Please describe the flight waiver provision program, including the categories under which the program operates and the number of personnel in these categories.

General WHEELER. All aeronautically designated personnel (naval aviators and naval flight officers) are assigned to one of the following categories. Assignment is dependent on age, years aeronautically designated, and present duty assignment.

Category I.—Those who are not both 45 years of age or more and who have not held designations 20 years or more.

Category II.—Those who are 45 years of age or more and who have held designations for 20 years or more.

Category III.—Those who have held designations for 15 years or more and who have been placed in this category by the Commandant of the Marine Corps. (This category is currently being expanded to include students in school over 90 days.)

Category II and III personnel may perform operational flying but are not authorized to fly proficiency, and flight requirements for pay are waived. Assignment to category II is automatic. Personnel are assigned to category III under the following circumstances:

1. Designated over 15 years and assigned duties which preclude regular flight activity because of geographical location or availability of proficiency aircraft.
2. Stationed outside the United States or in Alaska and no aircraft is available for flying.
3. Assigned to a course of instruction of 90 days or more.
4. In a terminal duty status awaiting separation from the service.

Numbers of aeronautically designated personnel currently assigned categories II and III: category II, 260; category III, 375.

Senator YOUNG. How do these numbers compare with those who received flight pay under this provision a year ago?

General WHEELER. A comparison of flight waivers is as follows:

Category II: fiscal year 1971, 314; fiscal year 1972, 260; fiscal year 1973, 239.

Category III: fiscal year 1971, 50; fiscal year 1972, 375; fiscal year 1973, 375.

The decrease in category II personnel is the result of increased retirements because of force reductions. The marked increase in category III personnel over previous estimates for fiscal year 1972 is the result of (1) prohibition of proficiency flying by students in school over 90 days, (2) return of aviators to isolated staff duties, and (3) funding constraints for proficiency flying. It is not anticipated that this number will change for fiscal year 1973.

FOREIGN CIVILIAN EMPLOYEES

Chairman ELLENDER. Please provide for the record the number of foreign civilian employees paid by your department and designated by country.

General WHEELER. Yes, sir.

(The information follows:)

Programed for fiscal year 1973 there are seven foreign nationals located in Cuba; 1,236 in Japan; and 1,274 on Okinawa.

SUPPORT OF FREE WORLD FORCES

Chairman ELLENDER. Are any funds included for fiscal year 1973 for the support of free world forces in this appropriation?

General WHEELER. No, sir; there are not.

ROTATION TO SOUTHEAST ASIA

Senator YOUNG. Last year the rotation policy to Southeast Asia was described in some detail. Has there been any change in that policy in the interim?

General WHEELER. Our policy concerning rotation to Southeast Asia remains unchanged. No Marines are returned to an unaccompanied FMF tour in Southeast Asia unless at least 2 years have elapsed since the last such tour.

VIETNAM CASUALTIES

Chairman ELLENDER. For the record, would you please provide a listing on the Vietnam casualties since the inception of the conflict?

General WHEELER. I will be glad to do so.

(The information follows:)

During the period 1961 to March 1, 1972, the Marine Corps has had 12,916 killed in action in Vietnam, two in Cambodia and seven in Laos. During the same period, the wounded in action totaled 88,526.

MISSING IN ACTION AND PRISONERS OF WAR

Chairman ELLENDER. For the record provide a tabulation of officers and enlisted personnel who are either missing in action or are prisoners of war.

General WHEELER. Yes, sir.

(The information follows:)

Officers listed as prisoners of war	15
Enlisted personnel listed as prisoners of war	10
Officers listed as missing in action	51
Enlisted personnel listed as missing in action	39
Total officers prisoners of war and missing in action	66
Total enlisted prisoners of war and missing in action	49
Total prisoners of war and missing in action	115

Officers and enlisted depicted by current grade

Colonel	2	Master gunnery sergeant	1
Lieutenant colonel	6	1st sergeant	1
Major	16	Gunnery sergeant	1
Captain	40	Staff sergeant	7
CWO–3	1	Sergeant	38
CWO–2	1	Private 1st class	1
Total officers	66	Total enlisted	49

REPROGRAMING OF FUNDS

Chairman ELLENDER. As is customary, would you provide a summary of all reprograming of funds for the past year.

General WHEELER. There were no formal reprograming actions in fiscal year 1972; however, the following funds within threshold were moved to support increased costs: Pay and allowances of officers was increased $3,832,000 to cover the additional cost of increased separation payments and Federal Insurance Contribution Act (FICA) payments; permanent change of station travel was also increased above the 1972 appropriation by $4,474,000 to cover the increased cost of the Military Air Command tariff rates, increased milage rates, and other minor travel rate increases. These funds were made available due to reduced costs in subsistence of $6,207,000 and $2,099,000 in strength reductions.

PROJECT 100,000

Senator YOUNG. Please address yourself to any changes that have taken place in Project 100,000 in the past year, including a description of what the project is attempting to accomplish and the effect, if any, that the introduction of the concept has had on the service.

General WHEELER. During 1971, two reductions in the mandatory quota for the enlistment of new mental standards personnel occurred. In January 1972, all mandatory recruiting quotas based on mental category were eliminated. The Marine Corps was pleased with each of these decisions, for each reduced the percentage of marginal recruits entering the Marine Corps. Our experience has been, in general, that the effect on the Marine Corps of Project 100,000 has been one of increased disciplinary problems, lengthened and more costly training requirements, and a significant increase in administrative discharges. There have, however, been marines from the lower mental categories

who have performed honorably and well. Because of this, we have established our new higher enlistment standards with a provision for the acceptance of young men from this category who have demonstrated by other means that their potential for successful service is excellent.

PROJECT TRANSITION

Chairman ELLENDER. Please indicate any significant changes that have taken place in Project Transition during the year.

General WHEELER. Transition vocational skill training centers have been established at Camp Pendleton, Calif., and Camp Lejeune, N.C. Assistance is provided to early release eligibles returning from overseas commands who opt for transition training in lieu of an early release. In addition, high priority transition eligible Marines in Conus may attend skill center training courses. Transition counseling and training assistance is now made available to marines enrolled in the drug abuse program through naval facilities at Miramar, Calif., and Jacksonville, Fla. Transition counseling assistance is being initiated for marines in overseas commands; specialized assistance is also made available overseas through the interagency overseas counseling assistance teams which include representatives of the Department of Labor, Veterans' Administration, and Office of Education (HEW).

EVIDENCES OF DISSENT

Senator YOUNG. What has been the history in the past year as to dissent in the service?

General WHEELER. Covert distribution of antimilitary newspapers on Marine Corps installations by a few dissident marines has occurred during the past year. These papers solicit membership in civilian dissident organizations and attendance at local rallies and demonstrations. They generally propagate a theme that the rights of the U.S. serviceman are being suppressed. We know of no case of violent activity generated by readers of these papers or by a dissident organization nor do we know of any onbase activity actually conducted by a dissident organization other than covert distribution of newspapers.

ACTIVE DUTY PERSONNEL ASSIGNED TO RESERVE WORK

Chairman ELLENDER. Please indicate the number of officers and enlisted personnel assigned to support of the Reserve forces.

General WHEELER. The number of officers and enlisted personnel assigned to support of the Reserve forces is shown on page 3–19 of the "Military personnel, Marine Corps," budget. For fiscal year 1973 there are 496 officers and 4,304 enlisted for a total of 4,800.

Chairman ELLENDER. What is the estimated cost of this support?

General WHEELER. The cost of this support is also shown on page 3–19 of the "Military personnel, Marine Corps," budget and is $35,894,000 for fiscal year 1973.

REIMBURSABLE PROGRAM

Chairman ELLENDER. Would you please provide an itemized list of those personnel who, in fiscal year 1973, will participate in reimbursable programs?

General WHEELER. Yes, sir. In fiscal year 1973, the reimbursable program will have seven officers and two enlisted Marines with the Central Intelligence Agency, five officers with the National Aeronautics and Space Administration, eight officers with the Selective Service System and one officer with the Federal Aviation Administration.

UNSUITABILITY DISCHARGES: GAO REPORT

Chairman ELLENDER. The General Accounting Office recently wrote a report dealing with the high incidence of unsuitability discharges from the Marine Corps. Please describe the problem.

General WHEELER. During the period studied by the GAO, the Marine Corps was undergoing a campaign to return to pre-Vietnam levels of professionalism. Standards of performance in all areas were raised, including those at recruit training. Because the quality of our recruits was not raised at the same rate due to forced acceptance of marginal men, the attrition rate for reason of unsuitability at recruit training rose significantly in 1970.

The Marine Corps realized before the GAO study that the discharge rate had increased more than desired or anticipated. Steps were taken to better screen applicants for enlistment and to revise training programs at the recruit training depots. As a result, the latest figures available show discharges for unsuitability at recruit training at less than one-third the rate existing during the GAO study. Further upward revision of enlistment standards and elimination by Congress of mandatory recruiting quotas for lower mental category personnel, as well as continuing review of training procedures at the depots, hold promise for an even further reduction in the attrition rate for reason of unsuitability.

Chairman ELLENDER. Thank you very much, General.

Reserve Personnel Marine Corps

STATEMENT OF BRIG. GEN. LEONARD E. FRIBOURG, U.S. MARINE CORPS, DIRECTOR, MARINE CORPS RESERVE

BUDGET REQUEST

Chairman Ellender. The next appropriation to be considered is "Reserve Personnel, Marine Corps," for which the fiscal year 1973 budget estimate is $78,155,000, which includes $4,155,000 for the January 1, 1972, pay raise.

PROGRAM AND FINANCING

At this point in the record there will appear certain program and financing information from the justifications.

(The information follows:)

DEPARTMENT OF DEFENSE—MILITARY—RESERVE PERSONNEL, MARINE CORPS

PROGRAM AND FINANCING

[In thousands of dollars]

	1971 actual	1972 estimate	1973 estimate
Program by activities:			
Direct program:			
1. Reserve component personnel	51,850	68,637	74,270
2. Reserve officer candidates	1,822	2,635	3,885
Total direct program	53,672	71,272	78,155
Reimbursable (total)	99	51	250
Total obligations	53,771	71,323	78,405
Financing:			
Receipts and reimbursements from:			
Federal funds	−83	−35	−234
Non-federal sources [1]	−16	−16	−16
Unobligated balance transferred from other accounts		−3,838	
Unobligated balance lapsing	2,728		
Budget authority	56,400	67,434	78,155
Budget authority:			
Appropriation	56,400	57,368	74,000
Proposed supplemental for Military Pay Act increases		8,194	
January 1972 pay increases supplemental/amendment		1,872	4,155

[1] Reimbursements are derived from sale of meals and clothing to service (10 U.S.C. 7601).

Note: The amounts shown as January 1972 pay increase supplemental amendment are not distributed to each individual appropriation in the fiscal year 1973 President's budget, but are reflected as a 1-line defensewide contingency amount. The amounts shown above are estimates pending final determination of the amounts to be requested when supplemental and amended estimates are formally transmitted.

Chairman Ellender. The principal witness is Brig. Gen. Leonard E. Fribourg, Director, Marine Corps Reserve.

You may proceed.

IV MARINE AMPHIBIOUS FORCE

General FRIBOURG. I appreciate this opportunity to present to you the fiscal year 1973 budget for the appropriations "Reserve Personnel, Marine Corps" and the manpower program on which it is based.

This appropriation provides for pay, allowances, clothing, subsistence, travel, and related costs for training members of the Marine Corps Reserve and for clothing for members of the Marine Corps Junior Reserve Officers Training Corps.

Prior to discussing the details of the fiscal year 1973 budget, however, I would like to summarize for the committee the present situation of the Marine Corps Reserve and provide the highlights of what we plan to accomplish by the end of fiscal year 1973.

The mission of the Marine Corps Reserve is to provide trained units and qualified individual marines available for active duty in time of war or national emergency. In the fulfillment of this mission, the major component of the Organized Marine Corps Reserve is designated as the IV Marine Amphibious Force. This amphibious force is a fully structured air/ground team, organized essentially in the same manner as a regular Marine Amphibious Force. This structure provides the Marine Corps with four divisions and four Marine Aircraft Wings, three of which are in the Active Forces and the fourth in the Reserve Establishment.

The IV Marine Amphibious Force is composed of the 4th Marine Division, the 4th Marine Aircraft Wing, and Combat Support and Combat Service Support units. The 272 units which comprise the division, wing, and support elements are located at 185 training sites throughout the country. The current disposition of IV Marine Amphibious Force units was a result of a restructuring of the Marine Corps Reserve on 1 October 1971. This restructuring involved the redesignation and/or relocation of 78 units and was accomplished to achieve and maintain a force structure nearly identical to that of an active Marine Amphibious Force. This restructuring also provided the opportunity to take optimum advantage of geographical areas with favorable recruiting potential and to match unit missions with available local training sites.

TRAINING

Training of the Marine Corps Reserve is accomplished both on a unit and individual basis. A reservist's initial period of active duty usually last 6 months and provides him with the basic military training afforded to all regular marines as well as the basic skills of his military occupational specialty. When the reservist's initial active duty training is complete, he may attend formal training to acquire certain technical skills, or he returns to his hometown where his unit is engaged in a 5-year cyclic training plan. This 5-year cyclic training plan, which was instituted in fiscal year 1971, provides combat units and supporting elements with an annual progression over a 5-year period from small unit tactics through large scale exercises during annual training duty. Drill periods are utilized to improve both individual and unit skills and to increase mobilization readiness, consistent with the mission of the unit.

Chairman ELLENDER. How often do they meet?

General FRIBOURG. They are multiple drill segments. They meet 1 week a month on Saturday and Sunday. That constitutes four drills a month.

Last year, approximately 41,000 marine reservists participated in annual training duty at various military installation throughout the country. These marines represented 95 percent of the total strength of Organized Marine Corps Reserve units.

During fiscal year 1973 annual training, two Marine amphibious unit exercises and one Marine amphibious brigade will be conducted as a part of the current 5-year cyclic training plan. Approximately 10,000 reservists will participate in these exercises.

Although the recent restructuring of the IV Marine Amphibious Force has temporarily degraded the training readiness of certain units, the high state of training readiness which existed prior to the restructuring is expected to be restored during fiscal year 1973. Subsequent training will be enhanced through a more advantageous use of local training areas during drill weekends.

STRENGTH: RELEASE AND RECRUITING

The Marine Corps Reserve manpower program for fiscal year 1972 was predicted on an Organized Reserve end strength of 48,276 for fiscal year 1971, however, the actual fiscal year 1971 end strength achieved was 47,006, or 1,270 below the projection. During fiscal year 1972, a total of 11,600 reservists are expected to be released from IV Marine Amphibious Force units due to the expiration of their Ready Reserve service. The approved manpower plan required a total of 10,800 recruits to meet fiscal year 1972 Organized Reserve average and end strength requirements of 45,849 and 44,613, respectively.

PRIOR SERVICE RESERVISTS

Chairman ELLENDER. What percentage of the reservists have served in the Active Marines?

General FRIBOURG. About 10 percent of our drill pay status are prior service-enlisted reservists. The rest of them are 6 months trainees. Now, the officers, of course, about 99 percent have active duty and combat experience.

MOBILIZATION

Chairman ELLENDER. As I recall, last year when the case was presented to us, there was testimony to indicate that for a period of 10 years no Marines were called to active duty.

General FRIBOURG. There was no mobilization by the President or the Congress of the Marine Corps Reserve during that time, except for 3 days during March 1970, when 2,250 reservists were activated for the postal strike.

Chairman ELLENDER. Have any been called in 1972?

General FRIBOURG. There has been no involuntary mobilization.

Chairman ELLENDER. Proceed.

STRENGTH: ACTUAL AND AVERAGE

General FRIBOURG. As of December 31, 1971, our actual on board strength was 42,354 with an average strength of 44,661. We experienced extremely poor recruiting during the first 6 months of this fiscal year and we are expanding every effort to meet our end strength and mandated average strength. In order to meet the fiscal year 1973 Organized Reserve end strength requirement of 44,903, the current manpower program requires 3,600 fewer recruits in fiscal year 1972. However, failure to meet the end strength requirement in fiscal year 1972 will carry over a fiscal year 1972 strength shortfall into fiscal year 1973 and will increase the difficulties of the Marine Corps Reserve in attaining its manpower objectives in fiscal year 1973.

It is emphasized that while personnel deficiencies exist within units, there are adequately trained members of the individual Ready Reserve who, although not members of the Organized Marine Corps Reserve, are available for service with the IV Marine Amphibious Force in the event of mobilization.

I would add that the figures I've discussed are those which appear in our Reserve personnel appropriation request. There are, of course, members of the Regular Establishment who serve in support of the Organized Marine Corps Reserve; 4,168 of these active duty Marines perform peacetime duties supporting organized units of the Division and Air Wing. They provide an important link between the Regular and Reserve Establishments and fill table of organization billets in the Division and wing structure upon mobilization.

EQUIPMENT

Units of the IV Marine Amphibious Force are authorized Marine Corps furnished equipment identical to that of active Marine Amphibious Forces. The amount and type of equipment which can be adequately maintained and utilized for training is held by the unit. Remaining assets are held in storage at Marine Corps supply centers. Restructuring of the IV Marine Amphibious Force required some reallocation of equipment to meet revised unit missions. This reallocation has been completed and with the exception of phased procurement items, all principal items required by the IV Marine Amphibious Force are either on hand at the unit, prepositioned in a Marine Corps or Naval Supply Center, or have been funded.

LOGISTICS

The logistic posture of the IV Marine Amphibious Force has continued to improve through the introduction of new equipment. Marine Corps furnished equipment to be introduced during the remainder of fiscal year 1972 and in fiscal year 1973 includes the M–16 rifle, the 175-millimeter, self-propelled gun, and a new family of amphibious landing vehicles, the LVTP–7 series. In the Fourth Marine Aircraft Wing, new Navy furnished equipment will include later versions of

F–8 and A–4 aircraft and by the end of fiscal year 1972, all helicopter squadrons will be equipped with or transitioning to the same models that are operated by the Active Forces. Deficiencies remain, however, in that the 4th Wing lacks electronic warfare, inflight refueling, and all-weather fighter and attack capabilities. Additionally, a deficiency exists in aviation ground support equipment and spare parts for sustained deployment of 4th Marine Aircraft Wing squadrons. These items are being identified and will be funded as feasible.

1972 APPROPRIATION AND 1973 BUDGET REQUEST

The revised budget estimate for fiscal year 1972 is now $71.3 million, and is based on an average paid drill strength of 45,849. The fiscal year 1972 Reserve personnel, Marine Corps appropriation was $57.4 million. An additional amount of $13.9 million, offset by a transfer from other accounts of $3.8 million, is required to fund the military pay and allowance increases effective in fiscal year 1972, and the new subsistence allowance authorized for Marine Corps Reserve officer candidates by Public Law 92–172.

The fiscal year 1973 budget request is for $78.2 million and is based on an average paid strength of 45,016. The amount requested for fiscal year 1973 is $6.9 million more than the revised fiscal year 1972 budget. This increase is due to full-year funding of pay and allowance increases authorized in fiscal year 1972 and is partially offset by a decrease in average paid strength of 833 personnel. The funds in the fiscal year 1972 budget and requested for fiscal year 1973 are adequate to support the manpower plan and training program upon which these budgets are based.

IMPROVED READINESS

I have touched briefly on the main elements of the Marine Corps Reserve program and the items which I thought would be of special interest to the committee. In closing, I would like to emphasize that the primary consideration in the planning and budgeting for the Marine Corps Reserve program is to directly relate requirements to increased mobilization and combat readiness. Any changes and improvements within our program, and all funds approved by the Congress, will contribute to the attainment of our overall objective—improved readiness.

The Commandant's goal is to maintain a IV Marine Amphibious Force capable of being rapidly mobilized and deployed to fight alongside our regular Fleet Marine Forces. With this goal in mind, the readiness posture of the IV Marine Amphibious Force is a top priority item within the Marine Corps.

While there has been no sizable callup of the Marine Corps Reserve since the Korean war, Mr. Laird's statement on August 21, 1970 that it was planned to use the Guard and Reserve in any future contingency, has given even greater weight to the attainment of a truly ready IV Marine Amphibious Force. We have the fullest confidence that the

IV Marine Amphibious Force is trained and ready to mobilize and can deploy units by M plus 60 days.

Gentlemen, this completes my prepared statement. I will be pleased to answer any questions you may have about this budget, our program, or to provide such additional information as you may request.

PRESENT STRENGTH

Chairman ELLENDER. What is your current strength?

General FRIBOURG. As of December 31, we had 42,354, sir.

Chairman ELLENDER. You said about 10 percent of those had served in the Active Marines?

General FRIBOURG. Among the enlisted about 10 percent, sir, and about 99 percent of the officers.

Chairman ELLENDER. And the rest——

General FRIBOURG. Are 6 months trainees under the law.

REGULAR MARINES TRAINING RESERVE PERSONNEL

Chairman ELLENDER. Please indicate the number of Regular Marine officers and enlisted personnel engaged in activities related to the training of the Reserves.

General FRIBOURG. There are 445 officers and 4,304 enlisted personnel of the Regular Establishment assigned to duty in support of the Marine Corps Reserve in fiscal year 1972.

Chairman ELLENDER. Are there any civilians?

General FRIBOURG. We have in our program, sir, a total of 74 civilians.

Chairman ELLENDER. That number is not included in the 4,800?

General FRIBOURG. No, sir; those are separate. They do not perform duty with the Organized Reserve units per se. They work at district headquarters.

Chairman ELLENDER. Those 4,800 are taken from the Marine Corps?

General FRIBOURG. Yes, sir.

Chairman ELLENDER. On active duty?

General FRIBOURG. They are regular marines on active duty and they fill mobilization billets within the structure of the Organized Reserve, division and wing.

Chairman ELLENDER. Are they on duty the year around?

General FRIBOURG. Yes, sir; they are at the training centers. We have no technician program such as the other services have.

COSTS OF REGULARS AND CIVILIANS

Chairman ELLENDER. What is the cost to the Government of the regular marines and the civilians utilized in Reserve work?

General FRIBOURG. The cost of regular marines, officers and enlisted, utilized in support of the Marine Corps Reserve is $7.6 million and $26.2 million, respectively, for a total of $33.8 million. The cost for civilians is $0.6 million. The overall cost to the Government is a total of $34.4 million for both regular marines and civilians.

SUMMARY OF OBLIGATIONS

Chairman ELLENDER. At this point there will appear a summary of obligations from the justifications.

(The information follows:)

SUMMARY OF OBLIGATIONS

[In thousands]

Budget activity	Fiscal year— 1971 actual	1972 estimate	1973 estimate
Reserve component personnel	$51,850	$68,637	$74,270
Reserve officer candidates	1,822	2,635	3,885
Total direct obligations	53,672	71,272	78,155

PROGRAM DRILL PAY STRENGTHS

Chairman ELLENDER. There will also appear at this point the tabulation on "Program drill pay strengths."

(The information follows:)

STRENGTH TABLES

Pay group	Paid drills	Paid days of active duty for training	1971 actual Begin	1971 actual Average	1971 actual End	1972 estimate Average	1972 estimate End	1973 estimate Average	1973 estimate End
A:									
Officer	48	16	2,963	2,954	3,019	3,211	3,265	3,260	3,265
Enlisted			40,203	39,811	39,752	37,498	36,248	37,123	38,408
B:									
Officer	24	16	171	173	198	6	0	0	0
Enlisted			41	40	47	0	0	0	0
C: Enlisted	0	180	4,502	4,407	3,990	5,140	5,100	4,633	3,230
Paid drill training (organized):									
Officer			3,134	3,127	3,217	3,211	3,265	3,260	3,265
Enlisted			44,746	44,258	43,789	42,638	41,348	41,756	41,638
Total			47,880	47,385	47,006	45,849	44,613	45,016	44,903
D:									
Officer	0	13	605	605	605	600	600	600	600
Enlisted			150	150	150	160	160	160	160
Other paid status (subtotal):									
Officer			605	605	605	600	600	600	600
Enlisted			150	150	150	160	160	160	160
Total			755	755	755	760	760	760	760
Total paid status:									
Officer			3,739	3,732	3,822	3,811	3,865	3,860	3,865
Enlisted			44,896	44,408	43,939	42,798	41,508	41,916	41,798
Total			48,635	48,140	47,761	46,609	45,373	45,776	45,663

RESERVE COMPONENT PERSONNEL

Chairman ELLENDER. At this point in the record there will appear the tabulation of "Reserve component personnel" by budget accounts.

(The information follows:)

SUMMARY BUDGET ACTIVITY 1.—RESERVE COMPONENT PERSONNEL

SUMMARY OF OBLIGATIONS

[In thousands]

Budget project title	Fiscal year— 1971 actual	1972 estimate	1973 estimate
Training—Pay group A	$37,552	$42,214	$45,479
Training—Pay group B	373	0	0
Training—Pay group D	646	685	719
Training—Pay group F	11,175	22,976	23,721
School training	1,692	1,631	1,687
Special training	268	790	812
Administration and support	144	340	1,852
Total direct obligations	51,850	68,637	74,270

TRAINING, PAY GROUP A

Chairman ELLENDER. For "Training, pay group A" the fiscal year 1973 request is for $45,479,000 as compared with $42,214,000 for fiscal year 1972. Please describe this program.

General FRIBOURG. This training program will provide scheduled drills and 16 days annual training duty for an average strength of 40,383 personnel. These drills are conducted as multiple drills of a minimum of 8 hours duration, counting as two drills or a minimum of 16 hours in one weekend, counting as four drills. Drills are conducted at 185 training locations throughout the United States. Funds requested for pay are based on 96 and 94 percent attendance at regularly scheduled drills for officers and enlisted personnel respectively. Annual training duty is based on 14 days training plus 2 days for traveling time. Funds requested are 96 percent of the average officer strength and 95 percent of the average enlisted strength. This training is normally accomplished as a unit as part of the Marine Corps Reserve 5 year cyclic training plan. This cyclic training plan provides combat units and supporting elements with annual training progression over a 5-year period from small unit, mission-oriented training through large-scale exercises during annual training duty. Also included in pay group "A" for fiscal year 1973 are 37,623 extra drills.

INCREASE IN TRAINING, PAY GROUP A

Chairman ELLENDER. Please justify the increase in the request over that for fiscal year 1972.

General FRIBOURG. The request for fiscal year 1973 is $45.5 million or $3.3 million more than required in fiscal year 1972. The increase consists of $3.4 million which is due to full-year funding of November 14, 1971, and January 1, 1972, pay raises. This increase is partially offset by a reduction of $0.1 million which reflects the net effect of minor adjustments. The largest of these minor adjustments is a decrease of 363 in the paid number of personnel.

Senator YOUNG. Would you explain the heading referring to extra drills?

General FRIBOURG. Extra drills are the additional paid drills over the regularly scheduled 48 drills in pay group A. This includes 29,162 additional flying training periods to be used to maintain and improve

flight proficiency for officers and the enlisted crews. Also included are 8,461 additional paid drills for ground personnel to be used to maintain technical skills, equipment, and administrative records and for training exercise planning.

TRAINING, PAY GROUP D

Chairman ELLENDER. For "Training, pay group D" the fiscal year 1973 request is for $719,000 as compared with $685,000 for fiscal year 1972. Describe pay group D.

General FRIBOURG. Pay group D consists of annual training duty for nonunit/nondrill pay ready reservists, officer and enlisted, who desire to maintain proficiency in their military occupational specialties. Reservists in this category attend 2-week formal courses or may be assigned to an activity of the Regular Establishment to increase skills in their military occupational specialties. Pay group D also includes a group of enlisted personnel who have a Ready Reserve obligation, but are not located within commuting distance of a Reserve training center. A total of 60 personnel are expected to be in this category in fiscal year 1973.

AVERAGE RATE INCREASE

Senator YOUNG. I note that the number of personnel involved is the same as that for fiscal year 1972, but that the average rates have increased. Why is that?

General FRIBOURG. The average rate in fiscal year 1973 is $945.82 or an increase of $44.34 over the average rate of $901.58 for fiscal year 1972. The increase is due to full-year funding in fiscal year 1973 for the November 14, 1971, and January 1, 1972, pay raises.

TRAINING, PAY GROUP F

Chairman ELLENDER. For "Training, pay group F," the fiscal year 1973 request is for $23,721,000 as compared with $22,976,000 for fiscal year 1972. Please describe pay group F.

General FRIBOURG. Pay group F provides initial active duty for training for those reservists who have had no prior military service. Reservists in this category attend the same boot camp and advanced training as every other new marine. This initial active duty for training period usually lasts for 6 months. In those instances where a reservist cannot complete required formal schooling for his military occupational specialty in 6 months, his initial active duty for training period is based on the length of formal schools required to qualify him for the military occupational specialty; for certain technical military occupational specialties, the initial active duty for training period may be as long as 12 months.

Chairman ELLENDER. Indicate the nature of the increase for this project.

General FRIBOURG. The increase of $0.7 million requested for fiscal year 1973 is due to full-year funding for November 14, 1971, and January 1, 1972, pay raises. The cost of the pay raises is partially offset by a decrease of 507 man-years in fiscal year 1973. The decreased man-

years of training reflects a reduction in fiscal year 1973 required recruit input of 3,633 personnel from the 10,833 recruits required in fiscal year 1972.

SCHOOL TRAINING

Chairman ELLENDER. For "School training" for fiscal year 1973, the estimate is $1,687,000 as compared with $1,631,000 for fiscal year 1972. Describe the various aspects of school training as it applies to the Marine Corps Reserve.

General FRIBOURG. The school tours consist primarily of career development schools, refresher-proficiency-type courses, technical training, and officer candidate school. The school training is designed to augment initial active duty training and other previously attained skills by providing additional instruction in a broad range of subjects on an individual basis. Career development courses such as command and staff amphibious warfare, staff noncommissioned officer academy, and amphibious planning keep the reservist proficient with new weapons, doctrines, and techniques. This program also provides necessary formal training when an individual is assigned a different military occupational specialty, or when a unit is assigned a new misson. The commissioning of officers through the Organized Reserve entails 12 weeks at officer candidate school, 26 weeks of officer basic training, and 2 months of added formal military occupational specialty schooling.

SPECIAL TRAINING

Chairman ELLENDER. For "Special training" for fiscal year 1973, the request is $812,000 as compared with $790,000 for fiscal year 1972. Describe the nature of special training.

General FRIBOURG. This program provides active duty for training for reservists for five purposes, as follows:

(*1*) *VMR–Air Support.*—Provides Reserve aircrews for Reserve air-ground exercises and Reserve troop lifts.

(*2*) *Conferences.*—Provides Reserve participation in conferences for annual training duty planning and conferences between district directors, Reserve commading officers and volunteer training units.

(*3*) *Marksmanship.*—Provides Reserve participation in marksmanship programs.

(*4*) *Interunit Maintenance.*—Provides Reserve maintenance teams to perform onsite maintenance for supported Reserve units.

(*5*) *General Officer Tours.*—Provides for Reserve generals to represent the Commandant of the Marine Corps at official functions and for inspection tours of subordinate units by assistant division-wing commanders.

SPECIAL TOURS

Senator YOUNG. Describe the special tours to support the marksmanship program and their estimated cost.

General FRIBOURG. Sir, the marksmanship program is divided into two parts. One phase provides for broad-based marksmanship clinics and competitions among Marine Corps Reservists at Marine Corps district, division, and Marine Corps Reserve championship matches.

The other phase supports participation by selected distinguished marksmen who are members of the National Marine Corps Reserve Shooting Team in regional, national, and international competitive events. Current funding provides for 333 3-day officer and 667 3-day enlisted tours at a cost of $130,000 and $197,700 respectively for a program total of $327,900.

THREE-DAY TOURS

Senator YOUNG. Please describe the 100 3-day tours for use by general officers.

General FRIBOURG. The Commandant of the Marine Corps has established as policy that each Reserve general officer have a minimum level of participation of 50 Reserve retirement credits per anniversary year. There are 10 Marine Corps Reserve general officers; five of these are major generals, and five are brigadier generals. Thirteen points are accumulated in pay group D for annual active duty for training. The remaining points are received through participation as assistant division commander (2), assistant wing commander (a), or as the representative of the Commandant of the Marine Corps at various speaking engagements and ceremonies.

ADMINISTRATION AND SUPPORT

Chairman ELLENDER. For "Administration and Support" the fiscal year 1973 request is $1,852,000 as compared with the $340,000 provided for fiscal year 1972. Please describe what is included in this project.

General FRIBOURG. "Administration and Support" provides funds to finance "Pay and Allowances" and permanent change of station travel for Reserve officers assigned to active duty with the Reserve program under 10 U.S.C. section 265. Also included are funds for the payment of death gratuities, disability, and hospitalization benefits to all officer and enlisted personnel undergoing paid training duty.

Chairman ELLENDER. What is the reason for the marked increase in this request?

General FRIBOURG. The increase of $1.5 million requested for fiscal year 1973 is due to an increase of 69 Reserve officers who will be assigned duty with the Marine Corps Reserve in fiscal year 1973. Those Reserve officers will replace an equal number of officers from the Regular Establishment. Notwithstanding this trade of 69 officers, the number of Regular Marine officers assigned to the Reserve program has been reduced by 78 since the end of fiscal year 1971.

RESERVE ORGANIZATIONAL STRUCTURE

Senator YOUNG. If there have been any organizational changes in the Marine Reserve in the past year, I wish you would describe them to the committee.

General FRIBOURG. In order to restructure the Organized Marine Corps Reserve to conform to a typical Marine Amphibious Force, it was necessary to provide the Fleet Marine Force augmentation units,

active force roundout units and ground reserve augmentation units with 4th Marine Amphibious Force designation of like occupational fields. Fifty-five 4th Marine Amphibious Force unit designations were relocated from training centers that had multiple 4th Marine Amphibious Force units. Because there were insufficient 4th Marine Amphibious Force designations of like occupational fields to relocate to the augment/roundout units, it was necessary to disestablish 45 Reserve units and, in some cases, to provide units with designations of a different occupational field. It was also necessary to activate 22 Reserve units so that the 4th Marine Amphibious Force would conform to Marine Amphibious Force.

CHANGES IN PERSONNEL STRENGTH

Chairman ELLENDER. Please provide the committee with a step-by-step tabulation of all major changes in personnel strength in the past year for the Reserve.

General FRIBOURG. The Marine Corps Selected Reserve achieved an end strength of 47,006 in fiscal year 1971. This was 1,270 less than the scheduled end strength of 48,276. During the first 5 months of fiscal year 1972, the Selected Reserve decreased by an average of 925 marines per month. During December and January this rate of loss has been reduced to an average of 190 marine reservists per month. On January 31, 1972, the Marine Corps Selected Reserve totaled 42,019.

PAY COST INCREASES

Senator YOUNG. Please describe the effect of recent pay cost increases on this budget.

General FRIBOURG. This budget contains three separate pay and allowances increases: The November 14, 1971, pay raise, January 1, 1972, pay raise, and the Reserve officer candidate subsistence authorization. These three increases added $13.9 million to the fiscal year 1972 program and $21.2 million to the fiscal year 1973 program. Since the increases are fully funded only in fiscal year 1973, these pay and allowance increases caused the fiscal year 1973 budget to be $7.3 million higher than fiscal year 1972. This higher cost is partially offset by a $0.4 million decrease due to the reduction in average strength of 833 personnel in fiscal year 1973. The net increase in the fiscal year 1973 budget is $6.9 million.

ALL VOLUNTEER FORCE

Senator YOUNG. I wish you would describe the effect, in your opinion, that an all-volunteer force may have on the Marine Reserve.

General FRIBOURG. According to studies, more than 75 percent of the enlisted personnel in the Reserves joined only as the result of draft pressure. The zero draft, coupled with antimilitary atmosphere so prevalent in the public sector today, indicates a bleak future for Reserve retention. Unless some very significant actions are planned to offset the effect of these conditions it will be difficult to maintain a Ready Reserve at the required manning level.

REPROGRAMING OF FUNDS

Chairman ELLENDER. Has there been any reprograming of Reserve funds in the past year?

General FRIBOURG. A total of $3,838,000 was reprogramed from appropriation Procurement Marine Corps. This action was necessary to finance the mandated average strength of 45,849 and the Reserve Officer Candidates subsidy.

CHANGES IN BUDGET SUBMISSION

Chairman ELLENDER. Describe any changes in budget submission imposed by higher authority on the Marine Reserve personnel request.

General FRIBOURG. The Secretary of Defense directed that the fiscal year 1973 budget request contain sufficient funds to support Reserve strength at levels mandated by the Congress. In addition, the Office of the Secretary of Defense, in reviewing the budget request, recommended the following adjustments:

	Millions
(a) PLC subsistence allowance (legislation enacted subsequent to submission of the request)	+$1.4
(b) Deletion of 51 Reserve officer billets originally programed for funding from this appropriation, now included in the active force appropriation	−1.0

Also, $4.2 million was added to cover the costs of the January 1, 1972, pay increase authorized by Public Law 92–210.

FORCE STRUCTURE CHANGES

Chairman ELLENDER. Describe, or include in the record, changes in force structure programed for fiscal year 1973.

General FRIBOURG. There are no changes in the structure of the 4th Marine Amphibious Force programed for fiscal year 1973.

RESERVE OFFICER CANDIDATES SUMMARY

Chairman ELLENDER. At this point in the record there will appear a summary of obligations for Reserve Officer Candidates by budget project.

(The information follows:)

SUMMARY BUDGET ACTIVITY 2.—RESERVE OFFICER CANDIDATES, SUMMARY OF OBLIGATIONS

[In thousands]

Budget project title	1971 actual	1972 estimate	1973 estimate
Junior ROTC	$184	$133	$223
Platoon leaders class and ROC	1,638	2,502	3,662
Total direct obligations	1,822	2,635	3,885

SUMMARY OF RESERVE OFFICER CANDIDATE STRENGTH

Chairman ELLENDER. At this point there will appear a summary of Reserve Officer Candidate strength.

(The information follows:)

SUMMARY OF RESERVE OFFICE CANDIDATE STRENGTH (AVERAGE NUMBERS)

	Fiscal year—		
	1971 actual	1972 estimate	1973 estimate
Platoon leaders class	2,989	3,193	3,360
Woman officers candidates class	88	88	159
Total Reserve officer candidates	3,077	3,281	3,519

JUNIOR ROTC

Chairman ELLENDER. For "Junior ROTC" for fiscal year 1973 the request is $223,000 as compared with $133,000 provided for fiscal year 1972. Please describe this program.

General FRIBOURG. The Marine Corps Junior Reserve Officer Training Corps, was authorized under provisions of the Reserve Officer Training Corps Vitalization Act of 1964. The Commandant of the Marine Corps officially activated the first Marine Corps Junior Reserve Training Corps at Jesuit High School, New Orleans, La., on May 17, 1966. Since then the program has expanded to 31 schools and a present strength of approximately 3,100 cadets. The Marine Corps Junior Reserve Officer Training Corps course of instruction is designed to emphasize leadership development and physical fitness. Leadership education is a 3 year level academic course, although, basic training in drill, ceremonies and marksmanship are included. Certain attitudes, appreciations and values are expected to be developed from the type and quality of instruction and leadership provided by Marine Instructors.

Retired Marine Officers and staff noncommissioned officers are utilized as instructors in the Marine Corps Junior Reserve Officer Training Corps program. All instructor applications are approved by the Commandant of the Marine Corps before being referred to the appropriate Marine Corps district director who is responsible for the conduct of the program. The district director arranges for interviews between applicants and school officials. Instructors are employees of the schools and are not considered to be on active duty.

Senator YOUNG. Do you anticipate being able to secure the added number estimated for fiscal year 1973?

General FRIBOURG. The Marine Corps does not anticipate any problems in securing the added numbers estimated for fiscal year 1973. As of February 28, 1972, eight additional units were approved by the Secretary of the Navy. An additional school remains to be selected. Enrollment in the new units is expected to average 125 students per unit.

COSTS OF JUNIOR ROTC PROGRAM

Chairman ELLENDER. Aside from the $223,000, what are the costs to the Government for this program?

General FRIBOURG. There is $607,000 budgeted in operations and maintenance, Marine Corps, to support the Marine Corps Junior

Reserve Officer Training Corps in fiscal year 1973. This amount represents costs for instructor salaries, equipment, and other operating costs.

PLATOON LEADERS CLASS AND ROC

Chairman ELLENDER. For "Platoon leaders class and ROC" the fiscal year 1973 request is for $3,662,000 as compared with the $2,502,000 provided for fiscal year 1972. Please describe this program.

General FRIBOURG. The platoon leaders class is an officer program for male college students attending regionally accredited colleges, who upon successful completion of all requirements, are commissioned as second lieutenants in the U.S. Marine Corps Reserve. The current platoon leaders class programs are the platoon leaders class (ground); platoon leaders class (Naval aviator); platoon leaders class (Naval flight officer); platoon leaders class (law). Members of the platoon leaders class programs who are enrolled as freshmen or sophomores attend two 6-week training courses at the Marine Corps Development and Education Command, Quantico, Va., during summer vacation. College juniors, seniors, and graduate students attend a single 10-week course at the Marine Corps Development and Education Command. The women officer candidate course is an officer program for college juniors, seniors, and graduates. As in the platoon leaders program, candidates are enlisted in the Marine Corps Reserve. Currently, two classes are conducted each year; one in the summer so that college undergraduates may attend, the other beginning in October. A provision is made for qualified enlisted women Marines to attend these courses also. This program supplies all the new women officer accessions for the Marine Corps. Commissions are tendered enlisted women Marine candidates upon successful completion of the women officer candidate course and to other candidates upon completion of training and baccalaureate requirements.

INCREASE IN COST

Chairman ELLENDER. Justify the increase in cost for fiscal year 1973.

General FRIBOURG. The platoon leaders class will have an increase of 238 in the average trainee strength in fiscal year 1973 at a cost of $0.2 million plus full-year funding of the November 14, 1971, and January 1, 1972, pay raises at a cost of $0.1 million, and an increase of $0.9 million for full-year funding of the platoon leaders class subsidy, for a total increase of $1.2 million in fiscal year 1973.

Chairman ELLENDER. Are there any questions? Thank you very much.

Operation and Maintenance, Marine Corps

STATEMENT OF MAJ. GEN. ALAN J. ARMSTRONG, ASSISTANT CHIEF OF STAFF, G–4, MARINE CORPS

BUDGET REQUEST

Chairman Ellender. The next appropriation we shall consider is "Operation and maintenance, Marine Corps" for which the fiscal year 1973 budget estimate is $383,263,000, of which $4,697,000 is for the pay raise effective January 1, 1972.

PROGRAM AND FINANCING

At this point in the record there will appear certain program and financing information from the justifications.

(The information follows:)

DEPARTMENT OF DEFENSE—MILITARY OPERATION AND MAINTENANCE, MARINE CORPS
PROGRAM AND FINANCING

[In thousands of dollars]

	1971 actual	1972 estimate	1973 estimate
Program by activities:			
Direct program:			
1. Strategic forces	6	6	6
2. General purpose forces	199,164	182,542	190,948
3. Intelligence and communications	789	792	816
5. Guard and reserve	8,601	8,490	8,094
7. Central supply and maintenance	119,823	89,550	92,869
8. Training, medical, and other general personnel activities	42,306	51,926	61,644
9. Administration and associated activities	26,234	25,891	27,968
10. Support of other nations	6,405	6,800	918
Total direct program	403,328	365,997	383,263
Reimbursable (total)	71,212	54,487	64,377
Subtotal	474,540	420,484	447,640
Intrafund obligations	−13,917	−10,800	−13,900
Total obligations	460,623	409,684	433,740
Financing:			
Receipts and reimbursements from Federal funds	−52,331	−38,687	−45,177
Non-Federal sources [1]	−4,964	−5,000	−5,300
Unobligated balance transferred from other accounts		−900	
Unobligated balance lapsing	1,860		
Budget authority	405,188	365,097	383,263
Budget authority:			
Appropriation	405,268	360,553	378,566
Transferred to other accounts	−80	−5	
Appropriation (adjusted)	405,188	360,548	378,566
Proposed supplemental for wage-board increases		2,200	
January 1972 pay increase supplemental/amendment [2]		2,349	4,697

[1] Reimbursements are principally from sales to commercial enterprises and individuals of goods and services (10 U.S.C. 2481, 7581, 7601, and 7602).

[2] The amounts shown as January 1972 pay increase supplemental/amendment are not distributed to each individual appropriation in the fiscal year 1973 President's budget, but are reflected as a 1-line defense-wide contingency amount. The amounts shown above are estimates, pending final determination of the amounts to be requested when supplemental and amended estimates are formally transmitted.

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Chairman ELLENDER. The principal witness is Maj. Gen. Alan J. Armstrong, Assistant Chief of Staff, G–4.

You may proceed.

APPROPRIATION COMPONENTS

General ARMSTRONG. Mr. Chairman, and members of the committee, I am Maj. Gen. Alan Armstrong, Assistant Chief of Staff for Logistics, Headquarters, U.S. Marine Corps; appropriation sponsor for the Operation and Maintenance, Marine Corps budget. I appreciate this opportunity to appear before you for the first time to present the Marine Corps request for operation and maintenance funds for fiscal year 1973.

The requested operation and maintenance funds are required to support Fleet Marine Forces of three active divisions, three active aircraft wings, one Reserve Division and one Reserve Air Wing and their normal combat support and combat service support units; the operation and maintenance of training bases, the Marine Corps Supply System, Marine detachments and security forces, support of allies, and administration and associated activities.

Costs for procurement of major end items and their related provisioning and replenishment spares, as well as ammunition, military personnel and family housing costs are excluded from this fund request.

SUPPORT OF ALLIES

Chairman ELLENDER. What do you mean by "support of allies"?

General ARMSTRONG. We have the military assistance service funded. We have a small amount of money for this.

Previously, we supported the Vietnamese Marine Corps, Thailand Marine Corps and the 2d Republic of Korea Marine Brigade serving in Vietnam. We provide table of equipment items under procurement appropriations and O. & M. costs for these forces.

In 1973 this will be confined only to the Vietnamese Marine Corps in that the Second Republic of Korean Marine Brigade redeploys and goes back to Korea.

A recent OSD decision removed the Thailand Marine Corps from this program for fiscal 1973.

Chairman ELLENDER. How much of your O. & M. appropriations do you use for the support of allies?

General ARMSTRONG. Very small, $0.9 million. That will be for the Vietnamese Marine Corps.

Chairman ELLENDER. Would you explain this more in detail?

General ARMSTRONG. The Operation and Maintenance, Marine Corps requirements for the Vietnamese Marines contain funds for filling table of equipment shortages of secondary items and for replacing projected combat losses of secondary items in fiscal year 1973. Examples of the secondary items provided are gas masks, field telephones, telephone wire, tool sets and test equipment for ordnance and motor transport, radio antennas and body armor. Funds are also provided for the procurement of textiles use for the manufacture of combat uniforms for the Vietnamese Marines. No funds are included for the support of U.S. Marine personnel in this budget project.

Chairman ELLENDER. You may proceed.

YEAR-END STRENGTH

General ARMSTRONG. The Marine Corps request provides support for a peacetime Marine Corps with a fiscal year 1973 end strength of 197,965. The requested funds are the minimum needed to provide the required training that will enable us to maintain the essential combat readiness posture of the Fleet Marine Forces.

INCREASE OVER 1972

The O. & M.M.C. budget request for fiscal year 1973 totals $383.3 million. This request represents a net increase of $17.3 million from the revised fiscal year 1972 estimate of $366 million. I will briefly explain the major items of increase and decrease contributing to this net increase.

MILITARY ASSISTANCE, SERVICE FUNDED PROGRAM

The major area of reduction is in the Military Assistance, Service Funded program that we discussed. This is due to the cessation of support of the Republic of Korea Marine Corps as a result of their redeployment from Southeast Asia. There are also reductions in civilian personnel costs resulting from the full year effect of strength reductions in fiscal year 1972. These reductions amount to 1,222 civilian personnel and are being accomplished primarily through normal attrition. Pay raises have partially offset the effect of these reductions.

RECRUITING PROGRAM: FUNDING INCREASE

In fiscal year 1973 the Marine Corps will again increase emphasis on the recruiting program. Increased support for recruiting beyond that required in fiscal year 1972 is $4.5 million. This increase is necessary to enable us to obtain the required personnel as we approach an All Volunteer environment. Additional recruiters will be supported and advertising will increase.

SEQUENTIAL TRAINING PROGRAM

There is a new increase of $268,000 related to the implementation of the sequential training program which combined recruit training and individual combat training. This cost is more than offset by the savings in manpower which will assist in reducing Marine Corps strength to the planned level.

Chairman ELLENDER. Is that a new program?

General ARMSTRONG. Yes, sir; it is one General Wheeler explained previously, combining the recruit training and infantry combat training.

Chairman ELLENDER. An additional $500,000 is requested to provide for this program. Would you please tell the committee more about this program, what it will entail, when it will become operational and so forth? If the program will reduce the number of courses of

instruction, I can see that there would be some savings realized. If that is the case, why do you need more funding?

General ARMSTRONG. Prior to November 1971, the Marine Corps sequential training program consisted of recruit, individual combat and skill qualification training. Recruit training was programed at 79 days (this included travel, processing and administrative time) and individual combat training was programed at 31 days for a total of 110 days for both individual courses. The specific length of skill training was programed at 4–40 weeks depending upon the particular skill that the individual was being trained for. Travel costs associated with the transfer of the individuals between each of these training phases were attributable to military personnel, Marine Corps funds. With a view toward improving our training program and saving manpower, the Marine Corps conducted a study of its sequential training program.

As a result of this study, an 11-week recruit training syllabus was developed. This revised course was implemented in November 1971 on the west coast as a pilot program. It will be officially adopted as the Marine Corps recruit training program in March of this year, when the program will be implemented at our depot at Parris Island, S.C.

The 11-week recruit training syllabus was developed by joining specific instructions from the 3-week individual combat training (ICT) course with the 9-week recruit training program. By eliminating certain duplication in the training and specific excess infantry-oriented instruction, a total of 38 training hours were saved from the ICT syllabus. Further savings in nonacademic time were gained by eliminating duplication in processing and administrative procedures as well as a week of housekeeping chores (mess duty) from the ICT program. As a result, the revised recruit training syllabus provides a total savings of 17 days from the programed average completion time for a marine undergoing the individual recruit and individual combat training courses. In our previous sequential training program, the Marines were transferred by permanent change of station (PCS) orders between the many training sites. However, under the new system there is only one transfer before the new Marines eventually arrive at their ultimate duty stations. This is a savings of one transfer cost for all Marines when compared to the previous program.

For recruits being trained on the west coast, this new program entails an additional 2 weeks of training at Camp Pendleton.

This follows their 2 weeks of marksmanship instruction that they receive at the same base. Primarily, the increased costs associated with the program on the west coast are for TAD expenses of the DI's for the added 2 weeks. While the instructional content of the 11-week program will be the same for both coasts, the recruits on the east coast will spend 1 week at Camp Lejeune for their field training. The difference between the east and west coasts is due to the availability of the necessary terrain and facilities at Parris Island. This enables the east coast depot to conduct some of the infantry-oriented subjects at the recruit depot itself, whereas San Diego is not capable of the

same procedures. The costs associated with the TAD of the DI's and the travel expenses for the DI's and recruits (contract bus service) is the largest single factor in the increased cost for the program. On the east coast, however, this is not a new cost, for the Marines would have to move to Camp Lejeune for further training if we continued the old system. The big difference is that the cost was previously supported under PCS funds, whereas now they are part of O. & M. funding. While the request for funds to support this program is greater than that previously requested for the same program, the total program is less expensive. This is due to the fact that PCS funds are decreased by this program as well as the one-time gain being realized as the Marines are available to their units earlier under this program.

Chairman ELLENDER. What kind of savings do you expect to achieve as a result of consolidating these programs?

General ARMSTRONG. It is anticipated that our training line will be cut by 1,400 man-years by this new program. Additionally, savings are expected in the area of improved training and its impact on reducing attrition rates as well as an improvement in our assignment practices and its resultant impact on improved performance.

WITHDRAWAL OF KOREAN MARINE CORPS FROM VIETNAM

Senator YOUNG. Mr. Chairman? General Armstrong, you mentioned that the Korean Marine Corps has withdrawn from Vietnam. How many Korean Marines were in Vietnam?

General ARMSTRONG. They had a brigade of about 6,800 people in the Republic of Korea 2d Marine Brigade, which was in I Corps area.

Senator YOUNG. Are they all withdrawn now?

General ARMSTRONG. They will be all withdrawn this month.

Senator YOUNG. Do you know how many other Korean troops are left in Vietnam? Are they being withdrawn, too?

General ARMSTRONG. I don't know, sir. They were down near the Saigon area. I was not familiar with them when I left.

Chairman ELLENDER. Proceed.

DRUG ABUSE PROGRAM: FUNDING INCREASE

General ARMSTRONG. Another increase in the training area relates to the drug abuse program. The requested funds will support training of Marines for drug abuse control teams and the purchase of films and other training material.

CIVILIAN PERSONNEL: CONSOLIDATED CIVILIAN CAREER TRAINING AND CIVILIAN FOOD SERVICE ATTENDANTS

There are significant changes in the area of civilian personnel. The requested funds will implement two new civilian personnel programs; convert 132 military billets to civilian, and improve the service in our commissary stores by hiring additional employees. The new personnel

programs are the consolidated civilian career training program and a plan to begin hiring civilian food service attendants for messhalls that are not now served by contract personnel.

Chairman ELLENDER. Why are you hiring civilians for messhall work rather than using KPs?

General ARMSTRONG. It is part of the DOD program of which we are a part, to make military life more acceptable. It is really part and parcel of the attempt to go to zero draft, Project Volunteer. If there is anything that is of displeasure to the people in the military in the lower ranks it is the messhall duty. They are drawn from the units to support the messes and this program lets them go back to their job and we think there is a measurable improvement in their training.

Chairman ELLENDER. Are the civilians who do the job permanent employees?

General ARMSTRONG. They will be permanent employees in those areas where that is the most economical arrangement, otherwise they will be under contract. We presently have civilian messmen at two stations, Albany, Ga., where they are permanent employees and Camp Butler on Okinawa which is under contract support.

Chairman ELLENDER. Those contract personnel work in the messhalls?

General ARMSTRONG. To do the mess attendant function.

Chairman ELLENDER. Cooks?

General ARMSTRONG. No, sir; marines do the cooking.

Senator YOUNG. If these marines were moved to combat in South Vietnam or any other place, would you have trained personnel to service the messes?

General ARMSTRONG. Yes, sir; we would be able to do that. We retain enough training programs and retain enough military supervisory personnel as far as the cooks and the bakers and the people who have the qualifications to run the messes and do the accounting and the rest of it.

CONTRACT PROVISIONS

Chairman ELLENDER. Are these contracts on a yearly basis?

General ARMSTRONG. Yes, sir; they are on bid.

Chairman ELLENDER. Do these contracts provide for compensation to the contractor based on the number of marines fed?

General ARMSTRONG. It is on a sliding scale, as I understand, on a per capita basis.

Chairman ELLENDER. All right.

General ARMSTRONG. The consolidated civilian career training program will establish training billets to be filled with trainees in such areas as supply and financial management. This program will also encompass apprenticeship positions for wage board employees. Beginning in March 1973, the Marine Corps will begin hiring civilians to perform duties in our messhalls in place of marines. Our marines presently performing these duties will then be free to devote full time to their primary mission.

CONSUMABLE SUPPLIES: CONSUMPTION OF VIETNAM-GENERATED EXCESS

During fiscal year 1972, the Marine Corps will finish consuming the excess supplies generated during Vietnam. We require $3.4 million in obligational authority to maintain the established level of consumable supplies in the Fleet Marine Forces.

Chairman ELLENDER. Were the supplies you speak of shipped from Vietnam as excess?

General ARMSTRONG. Yes, sir; they were excesses.

Chairman ELLENDER. What did they consist of, primarily?

General ARMSTRONG. Well, just about everything that is consumable, Mr. Chairman. I would say spare parts, organizational equipment, and consumable items that the operating forces would charge to operation and maintenance. There were two reasons for the excess; one, was our redeployment and the change in consumption rates. The other is that we deactivated units pretty fast during this period. Naturally, things were in the pipeline. So, Fleet Marine Forces in the Pacific in fiscal year 1972 have been living off the shelf of these accumulations to the tune of about $3.4 million.

FURNITURE, EQUIPMENT, AND UTILITIES FOR RECENT CONSTRUCTIONS

The completion of military construction projects authorized and funded in prior years requires $6.9 million to purchase furniture and other movable equipment needed to make facilities usable. Provision of utilities to these buildings, many of which are air-conditioned barracks, will cost $1.1 million annually.

The funds requested in this appropriation are necessary to insure that we are able to recruit and effectively train the marines required to support our assigned missions. Additionally the requested funds will provide for the support of these marines and the operation and maintenance of their equipment in order to insure that we have a ready usable force.

This completes my formal statement. I will be glad to answer any questions on this appropriation request.

POSSIBLE UTILIZATION OF EXISTING BUILDINGS

Chairman ELLENDER. In reference to the military construction, before you construct new buildings for training, do you canvas whether or not other Reserves or National Guard units have buildings there?

General ARMSTRONG. Yes, sir; within a practical proximity.

Chairman ELLENDER. I presume where there are facilities already there that you use them under some agreement with the Guard or the Reserves?

General ARMSTRONG. Yes, sir; we would. Unfortunately, our major installations are pretty isolated and we do the reverse, as a matter of fact. We use our regular facilities to support the Reserve activities to a greater extent than we do the opposite.

Chairman ELLENDER. Notwithstanding that, you have an item here of $6.9 million for construction. You expect to use that?

General ARMSTRONG. Yes, sir.

Chairman ELLENDER. Let me make sure of one thing. Before you start construction, you do try to utilize available buildings that belong to the Government, whether they are Marine, Navy, or another service?

General ARMSTRONG. Yes, sir. Now, this $6.9 million, I want to make very clear, sir, is to outfit with furniture and movable items of equipment, buildings that have been built. These are primarily enlisted quarters and bachelor officer quarters that are being completed during this year.

UTILIZATION OF AVAILABLE FURNITURE

Chairman ELLENDER. Before that was done, I presume you canvassed to see whether or not the Government owned the facilities——

General ARMSTRONG. Yes, sir; those which could be used.

Chairman ELLENDER. Now, do you buy new furniture or do you look for excesses that may be in the hands of the Government?

General ARMSTRONG. We screen for excesses. The excess furniture that we get through screening is normally used as replacement furniture. When we need to reinforce our inventory we go through other governmental agencies, especially GSA. These are programs along with new construction. We do program and budget directly for equipping a new building with new furnishings.

Chairman ELLENDER. Even though you have some available?

General ARMSTRONG. As far as the program is concerned, because we have to budget so far in advance, it is impossible to determine whether someone else will have excess at the time required.

Senator PASTORE. Who in the higher chain of command supervises whether you do cooperate with the search for items that are still usable? Is that left up to you exclusively? You have already said that you search for other furniture that could be used. So you would not have to buy new furniture. I suppose you do that and you do it conscionably and you do it prudently. Is there someone who makes sure that you do do it?

General ARMSTRONG. Prior to my appearance this budget was thoroughly reviewed by the analyst of the Navy Secretariat, OSD, and the Office of Management and Budget.

Senator PASTORE. In other words, supervision is contained within the system. This committee is not the only one with oversight authority?

General ARMSTRONG. Yes, sir.

REDUCTION BY OSD

Chairman ELLENDER. I would like to know how much the budget request that you generated within your service was reduced by the Office of the Secretary of Defense and where these reductions were made. I want to know the specific programs that were reduced and by what amount. Also, please indicate exactly what the additional requests were for.

General ARMSTRONG. The initial Marine Corps submission to OSD/OMB was for $393.1 million. The OSD/OMB made net adjustments of −$14.5 million. The reductions made were: specialized training (−$1.5), average civilian personnel manyear cost (−$4.2), public affairs (—$0.1), civilian employment (—$4.2) and Project Volunteer (−$6.4). These decreases totaled − $16.4 million offset by the following increases: health benefits (+$0.4), transportation of things rate adjustment (+$0.1), drug abuse program (+$0.7), currency revaluation (+$0.7) and civilian pay raise (+$4.7). If allowed the reduced funds would have been applied in the following manners: (−$1.5) specialized training—increased input of personnel to schools to insure they receive requisite training before being assigned to an operational unit, (−$4.2) average civilian personnel man-year costs this reduction was based on savings expected as a result of the 90-day freeze on within-grade advancements, and wage board pay increases the reduction in average grade required by OMB bulletin 72–4 and the deferral of wage surveys for wage board employees. To the extent that any of these savings do not materialize it will be necessary to make reductions in other programs in order to pay civilian employees. (−$0.1) public affairs—maintenance of a higher level of civilian fiscal year 1973 end strength in public affairs. (−$4.2) civilian employment—would permit the Marine Corps to maintain a fiscal year 1972 end strength compatible with the authorized fiscal year 1973 end strength thereby precluding continuous firings and hirings. (−$6.4) Project Volunteer—the majority of these funds would have been expended on barracks improvement and barracks furniture and furnishings.

BUDGET CHANGES

Chairman ELLENDER. The second item I would like you to furnish the committee is a tabulation of the changes to the original fiscal year 1972 budget estimate that result in the revised 1972 estimates that appear in the fiscal year 1973 justification book. Please break this down by budget activity and budget program, listing the specific items and the amount of increase or decrease.

General ARMSTRONG. The material referred to follows:

(Dollars in thousands)

Program	OSD action	Congressional reduction	Transfer to GSA	Adjust to appn. (OSD action)	Civilian pay graded	Incr. ungraded	Master lab. cont.	Monroney amend.	Total
2. General purpose forces:									
2A forces		−$2,241		−$2,693	+$6	+$15			−$4,913
2B base ops	−$1,458	−1,262	−$5	+3,025	+858	+1,548	+$400		+3,106
2C command				−599					−599
5. Guard and Reserve	+1			−112	+14	+1			−96
7. Central supply and maint.:									
7A depots	−112	−92		−395	+104	+269		+$175	−51
7B ICP	−105	−74		+176	+284	+20			+301
7C base ops	−184	−259		+640	+291	+242		+149	+879
7D oth. log	+13	−65		−1,612	+76	+347		+276	−965
8. Training, medical, and other act.:									
8A rec. trng	−49	−203		+2,648	+87	+204			+2,687
8B spec. trng	−499			+568	+25	+2			+96
8C prof. trng	−57	−171		+431	+123	+261			+587
8D flt. trng				+8					+8
8E others	+1	+307		−1,500	+14				−1,178
9. Admin. and assoc. act.:									
9A dep. hq	−23	−318		+531	+352	+1			+543
9B fld. hq	−7	−60		+374	+115	+19			+441
9C oth. spt				+160					+160

COMPARISON WITH FISCAL YEAR 1972

Chairman ELLENDER. Finally, using the same format as in my last request, I would like you to furnish the committee a tabulation of the increases and decreases from the revised 1972 estimates that you are requesting in the fiscal year 1973 budget. We have or will have covered most of these during the course of the hearing, but I would like to have it all consolidated for consideration when it comes time to sit down and make some decisions.

(The material follows:)

[Dollars in thousands]

Program	Graded pay raise	Health benefits	Civilian messmen	Civilian personnel career training	Man-year reduction	Increased commissary hours	MRP	Supplies and equipment maintenance	Furniture and furnishing	Collateral equipment	Rent and utilities	Travel per diem	Official mail	Other item
2. General purpose force:														
2A	+$5						−$74	+$3,396	+$147					[1] −$689
2B	+857	+$93	+$963	+$268	−$2,643	+$244	+72	−40	−2,217	+$5,853	+$1,037	+$66		[2] +1,068
3. Intelligence and cryptology:														
3A								−13				+28		
3B								+9						
5. Guard and Reserve: 5A	+16						−1,022	−431			+50		+$90	[3] +39
7. Central supply and maintenance:														
7A	+105	+21			−902									[4] +343
7B	+283	+12			−323									[5] +135
7C	+291	+29	+34	+158	−688	+46	+141	+481	+90					[6] +474
7D	+76												+948	[7] +1,565
8. Training, medical, and other general purpose action:														
8A	+86	+11		+32	−214	+7	+522	+226		−134	+24			[8] +242
8B	+25							+504				+1,557		[9] +579
8C	+123	+13	+123	+41	−198	+58	+149	+1,275		−331				[10] +335
8D								−7						
8E	+14							+262	−455		−17	+325	+374	[11] +4,167
9. Administration and associated actions:														
9A	+346	+13											+356	[12] −120
9B	+117	+9		+68			+64	+105						[13] +836
9C	+4							−13	+3			+8		[14] +281
10. Support of allies: 10A														[15] −5,882
Total	+2,348	+201	+1,120	+567	−4,968	+355	−148	+6,616	−4,232	+5,388	+1,094	+1,984	+1,768	+3,373

Net change +$17,256.

[1] Includes: −$1,430 transfer to O. & M., +$700 SCAMP, +$41 mess and galley.
[2] Includes: +$41 military/civilian conversion, +$529 mess and galley, +$992 currency revaluation, −$214 military strength reduction, −$280 ADP.
[3] Includes: +$57 MTDS (Reserve), −$68 Reserve restructuring, +$50 micellaneous.
[4] Includes: +$343 care in storage.
[5] Includes: +$135 publications.
[6] Includes: +$100 selectric typewriter/microfilm, +$41 Centrex phone, +$34 contract field printing, +$243 ADP, +$56 micellaneous.
[7] Includes: +$873 depot level maintenance, +$100 transportation of things, +$919 contract engineering support, −$35 task order services, −$500 product improvement, LVTP7, −$4 nonstandard photography, +$212 employee compensation.
[8] Includes: −$258 military strength reduction, +$500 basic sequential training.
[9] Includes: −$232 basic sequential training, +$42 training devices, +$683 drug abuse, +$46 ITV maintenance contract, +$40 equipment.
[10] Includes: +$170 military/civilian conversion, +$54 miscellaneous, +$111 degree program/NESEP.
[11] Includes: +$490 sedan leasing, +$267 out-of-pocket expense, +$296 vehicle repair, +$2,731 advertising, +$30 board/lodging, +$176 PLC flight indoctrination, +$207 MCJROTC, −$30 other personnel costs.
[12] Includes: −$116 other personnel costs, −$4 miscellaneous.
[13] Includes: +$233 ADP, +$17 miscellaneous, +$125 other personnel costs, +$325 military/civilian conversion, +$136 GIMMIS.
[14] Includes: +$121 uniforms for dischargees, +$160 welfare/recreation.
[15] Includes: −$6,007 support of Republic of Korea Marine Corps, +$185 secondary items for Vietnamese Marine Corps.

INCREASE IN CIVILIAN PERSONNEL

Chairman ELLENDER. On page 2–7 of your justification, I notice that you are requesting an increase of 1,184 civilian personnel. The increases are broken down into seven categories and I would like you to furnish for the record a table showing the staffing in these seven categories in 1972, the increase requested, and then the total for 1973.

General ARMSTRONG. I will furnish the information.

(The information follows:)

END-YEAR ON-BOARD STRENGTHS FOR CERTAIN CATEGORIES OF CIVILIAN PERSONNEL

Category	Fiscal year 1972 strength	Fiscal year 1973 strength	Change
Direct fund:			
Consolidated civilian career training program		136	+136
Military/civilian conversions		132	+132
Improve commissary stores service	759	854	+95
DOD uniform food services program		650	+650
Other net decreases	5		−5
Net increase direct			+1,008
Reimbursable fund:			
Family housing	859	1,006	+147
Dependents' schools	71	91	+20
Property disposal	174	183	+9
Net increase reimbursable			+176
Total net increase			+1,184

Chairman ELLENDER. Would you then please give us a brief explanation of why these additional personnel are needed and where they will be used?

General ARMSTRONG. Yes, sir. The consolidated civilian career training program will provide an input of trainees for available replacement of skilled employees in responsible graded and ungraded positions. The projected trainee inputs are not intended to cover all positions vacated. They are intended to provide only a small input of trainees on a continuing basis who will be capable in the years to come to fill the more responsible civilian positions. This program will be conducted at major Marine Corps activities.

Military/civilian conversions are planned in the areas of pay allotments, records processing, and lithography. It is considered that certain positions presently filled by enlisted personnel in these areas can more appropriately be filled by civilian personnel. The positions are 30 pay allotment positions at the Marine Corps Finance Center, 48 records processing positions at the Marine Corps Automated Services Center, 11 lithographer positions at Camp Lejeune and 43 lithographer positions at the Marine Corps Development and Education Command, Quantico.

Commissary store sales have increased over 45 percent since 1967 primarily because of rapidly increasing patronage which has not been balanced by offsetting increases in staffing. The additional civilian personnel for fiscal year 1973 will permit the Marine Corps to provide a reasonable standard of patron service at the same level as that presently provided by other military services. This increased staffing is not

designed to raise service to a degree comparable to commercial standards but only to support fiscal year 1973 sales volume workload.

Under the DOD uniform food services program, military messmen will be replaced with civilians. It is felt that this will assist in improving the morale of marines due to the unpopularity of mess duty. It will also free them for their primary duties as marines. This program will be implemented over a 5-year time period in non-FMF messhalls throughout Conus and Hawaii.

In the reimbursable fund area, 147 are to be used at 13 Marine Corps activities in the maintenance support of the family housing program. The O. & M., Marine Corps, appropriation is reimbursed by Defense housing funds. Additional civilians are needed at Marine Corps Base, Quantico (10), and Camp Lejeune (10) for dependents schoolteachers. This is due to an increase in the number of students attending these schools. The remaining additional nine civilian personnel are required at Marine Corps Supply Center, Barstow, in support of the property disposal operations.

GENERAL PURPOSE FORCES INCREASED REQUISITIONING

Chairman ELLENDER. On page 2–14 you indicate an increase of $2 million, which is due to increase requisitioning (plus $3.4 million) offset by transfer of funding for support of aviation ground equipment to the O. & M., Navy, account (minus $1.4 million). Would you please explain in detail what this increase in the requisition level is, and why it has to be such a large increase in 1973? In your response, I would like you to explain what you think your normal level of requisitioning should be and how you determined that that should be the norm.

General ARMSTRONG. Yes, sir. The $3.4 million is for consumable supplies, repair parts, batteries, organizational equipment and clothing, administration supplies, et cetera, for the FMF. In normal operations, the level of support provided from supplies on the shelf and prior year orders remain constant. However, in times of military buildup or a cutback, the level of orders and inventory fluctuate considerably. The impact is that during a buildup, orders for supplies and services exceed consumption and inventories are inflated. In returning to a peacetime training environment, prior year orders and inventories are decreased and become a source of financing operations. The Marine Corps finds itself in the latter situation in fiscal year 1972. Outstanding orders from prior years (fiscal years 1970 and 1971) and consumption of onhand inventory are being used to support fiscal year 1972 operations in the amount of $3,396,000. This situation stabilizes in fiscal year 1973; however, in order to support operations at the fiscal year 1972 level, NOA will have to be provided in lieu of the support previously provided by using prior year orders and onhand supplies. Our normal level of requisitioning is approximately $38 million annually, which is the level required to support our active Fleet Marine Force units in a peacetime environment. This norm was determined from an analysis of Marine Corps peacetime operations, with a subsequent determination of the level required to support these operations.

TRANSFER OF FUNDS FOR AVIATION GROUND EQUIPMENT

Chairman ELLENDER. I would also like you to explain the particulars behind the transfer of funding for the support of aviation ground equipment. What is the reason for the transfer, and why is it being made at this time?

General ARMSTRONG. The decrease —$1,430,000 is due to transfer to O. & M.N. of funding responsibility for support of aviation ground equipment. The original section "M" transfer of O. & M.N. dollars to the Marine Corps-supported operation and maintenance costs of all section "M" equipment including a number of Navy peculiar items for which costs were not known. The transfer was made with the agreement that as costs for support of the Navy peculiar items become known, a like dollar amount would be returned to the Navy. The amount to be returned is $1,430,000. Typical items supported by this transfer include: Aircraft tractors, liquid oxygen pumps, vaporizing units, air maintenance vans, runway sweepers, and bomb sweepers.

SENSOR CONTROL AND MANAGEMENT PLATOONS

Chairman ELLENDER. There is also reflected in the justification on pages 2–14 an increase of $700,000 for operation of sensor control and management platoons that were "not previously funded in this appropriation." If these platoons were not funded in this appropriation before, what appropriation did fund them?

General ARMSTRONG. These platoons (SCAMP) were previously funded by the Defense special project group which controlled expenditures of all armed services sensor-related funds without differentiation as to the Department. A Secretary of Defense memo of December 12, 1970, directed transfer for operational DSPG systems to the individual services. This transfer is effective for the Marine Corps in fiscal year 1973.

Senator YOUNG. Would you please tell what the functions of these platoons are, how many there are, how large, et cetera? In other words, tell us all about the sensor platoons and why they are necessary.

General ARMSTRONG. Sensors are utilized for surveillance, intelligence collection, and target acquisition and complement other systems that perform similar functions. As employed by the Marine Corps, they provide information in real time as opposed to most other systems which do not. The sensor subsystems and their equipment have placed an additional load on the presently organized supply maintenance and intelligence staffs of our operating forces. To ease this situation and to insure timely, accurate and efficient use of sensor technology, a SCAMP has been activated at the division level. We currently have three platoons, each platoon with an authorized strength of two officers and 43 men.

The mission of the SCAMP is to establish the capability for remote sensor surveillance employment in amphibious operations, support contingency operations, and to conduct sensor surveillance training and testing as required. The platoon functions under the G–2 and is employed in support of the division to:

Control and manage remote sensors and associated equipment.

Inspect and maintain sensor equipment.

Provide sensor employment squads and teams to lower echelons as required.

Provide necessary sensor surveillance training for selected units and personnel.

Provide logistic and limited maintenance support to organic sensor assets.

Chairman ELLENDER. Tell us specifically what the $700,000 that you are requesting for these sensor control and management platoons will provide.

General ARMSTRONG. The $700,000 is to support the maintenance, batteries, and spare parts for equipment which is almost entirely signal receiver, relay equipment, and ground sensors.

CLASS III PLANT PROPERTY

Chairman ELLENDER. Another item on pages 2–14 is for an increase of $41,000 for what you call class III plant property, and mess and galley equipment. Would you please tell us exactly what this $41,000 will buy and why?

General ARMSTRONG. This increase of $41,000 includes $12,000 for class III plant property and $29,000 for mess and galley equipment.

The $12,000 for class III plant property will provide items such as typewriters, adding machines, drill presses, lawn mowers, power saws, et cetera, to replace items worn out from normal use.

The $29,000 for mess and galley equipment will provide items such as beverage dispensers, refrigerators, gas ranges, et cetera. These funds are required to replace items worn out from normal use and to upgrade the Marine Corps food services provided in Government messes.

PROJECT VOLUNTEER

Senator YOUNG. There are two items in this breakdown of increases and decreases that will surely come up time and again throughout the hearing and I wonder if you wouldn't consolidate the information for me and insert it in the record at this point?

The first item is with reference to Project Volunteer. Please furnish a breakdown of all the increases and decreases associated with this program by budget activity and program. We will deal with each one specifically when we encounter them in the justification.

General ARMSTRONG. Yes, sir; I will do that.

(The information follows:)

PROJECT VOLUNTEER

[Dollars in thousands]

Budget activity or budget project	Plus or minus	Item
2 General purpose forces:		
2A Forces	—$74	Maintenance of real property.
2B Base operations	—345	Commissary hours/barracks furnishing.
5 Guard and Reserve:		
5A Support of the Marine Corps Reserve	—1,350	Recruiting support/Reserve facilities.
7 Central supply and maintenance:		
7C Supply base operations	+124	Food services/barracks furniture.
8 Training, medical and other:		
8A Recruit training	—34	Barracks improvement.
8C Professional training	+54	Commissary hours/food services.
8E Other activities	—1,821	Recruiting and examining.
9 Administration and association activities:		
9A Departmental headquarters	+29	Do.
9B Other field activities	—79	Barracks improvement.
Total	—3,496	

General ARMSTRONG. In preparing the justification specific items of increase and decrease were not identified to Project Volunteer. In some cases, such as maintenance of real property, changes resulting from volunteer initiatives were combined with other changes in developing the justification. The changes from the fiscal year 1972 volunteer program of $16.4 million to the fiscal year 1973 program of $12.9 million are summarized in the above table.

BARRACKS FURNISHING

Senator YOUNG. The second item is with regard to the barracks furnishings. I would have thought that this would have been considered a part of the Project Volunteer program, but you have broken it out separately on page 2–14. Would you please consolidate the increase due to this program that appear in the request?

General ARMSTRONG. The requirements for barracks furniture and furnishings are not included in the fiscal year 1973 Project Volunteer program, since only higher priority items could be requested within the total program allocation for the Marine Corps. A summary of the increases and decreases for furniture and furnishings follows:

Budget project	Change	Justification page
2A Forces	+147	2–14
2B Base operations	−2,217	2–16
7C Supply base operations	+90	2–31
8E Other activities	−455	2–44
9C Other support activities	+3	2–49
Total	−2,432	

FURNITURE MODERNIZATION

Senator YOUNG. Would you also please explain, specifically, the request for the additional $147,000 requested on page 2–14? What will be purchased with these funds? Will this be enough to bring the entire Corps up to par in this regard?

General ARMSTRONG. The additional $147,000 will allow for initiation of efforts to modernize and improve furniture and furnishings in consonance with recently upgraded Department of Defense standards. Financial resources for furniture and furnishings for bachelor housing have been far below that required to either maintain present standards or to upgrade equipment. The use of available funds to meet more urgent operational requirements has caused deferment of the replacement and improvement of furniture, furnishings, and equipment in existing facilities. Accordingly, significant deficiencies have developed in the habitability standards of bachelor quarters at Marine Barracks.

This increase will provide for such items as dressers, mattresses, beds, chairs, desks, tables, lamps, lockers, mirrors, etc.

This will not bring the entire Marine Corps up to par. This amount will only provide for items required at the Marine Barracks, Pearl Harbor ($65,000), Marine Barracks, Philadelphia ($20,000) and Marine Barracks, Key West ($62,000).

REPLACEMENT OF SKILLED EMPLOYEES

Chairman ELLENDER. I see on page 2–16 that you are requesting $268,000 for a civilian personnel training program, "with the purpose of eventual replacement of skilled employees retiring, and otherwise terminating active employment with the Marine Corps." Would you please explain to the committee what this program is and why it is being initiated? I realize that it is to train replacements in skilled areas but what areas are you referring to and why can't personnel to fill these positions be hired from the civilian economy?

General ARMSTRONG. This program is to provide input of trainees for available replacement of skilled employees in responsible graded and ungraded positions.

Addressing the ungraded first, over one-third of the skilled journeymen in this category will be eligible for retirement in the next 10 years. Many are long-service Marine Corps employees serving in key supervisory positions. Presently, the Marine Corps has no unified system to provide an input of trainees to replace these key journeymen and supervisors as they retire.

Craftsmen in the trades can be recruited from the labor market or developed through helper trainee programs. But experience indicates, as evidenced in various Marine Corps activity inspection reports, these sources do not generally provide the caliber of individuals who are fully capable and qualified to assume the more responsible ungraded positions in the Marine Corps. To assure an input of individuals of this caliber the Corps needs a centrally managed program that will provide the quality of training normally associated with apprenticeship. Such a program can provide the Corps with a source of fully qualified journeymen, who have the pride in workmanship and espirit de corps normally associated with those they will be replacing.

As to our graded work force, like the ungraded, many of our key supervisors will be eligible for retirement within the next 10 years. It is our desire to be able to replace these supervisors with employees who have started as traineers and have worked their way up through the ranks.

I want to point out, however, that the trainee inputs projected for both the graded and ungraded service are not intended to cover all positions vacated. They are intended to provide only a small input of trainees on a continuing basis who will be capable in the years to fill the more responsible civilian positions.

Chairman ELLENDER. Also would you tell us where these training programs will be conducted and by whom?

General ARMSTRONG. Yes, sir. These programs will be conducted at major Marine Corps activities by the respective activities training staff and supervisory work force.

CIVILIAN PERSONNEL INCREASE

Chairman ELLENDER. Will there be an increase in civilian personnel necessary to implement this program?

General ARMSTRONG. Yes, sir. We are asking for a total of an additional 136 trainee positions for the program. Of the 136 positions, 65 are being requested in this budget project.

PRINTING PLANT AT CAMP LEJEUNE, N.C.

Chairman ELLENDER. You are asking for an additional $41,000 for the conversion of "military to civilian billets in the printing plant at Camp Lejeune, N.C." Would you please explain to the committee why this conversion is necessary, including the number of billets to be converted and the grades at which they are to be converted?

General ARMSTRONG. Yes, sir, military billets at Camp Lejeune and also at Quantico were found to utilize skills that were not required anywhere else in the Marine Corps. Consequently it was considered to be more suitable to train and utilize civilians for these tasks than military personnel. There are 11 of these positions at Camp Lejeune which do not require military skills. It is estimated that the civilian replacements will be one GS–9, one GS–5, and the remaining ungraded personnel.

INCREASE IN COMMISSARY PERSONNEL

Chairman ELLENDER. I believe I asked a similar question of the other services when they requested additional personnel for commissaries and justified the request because of "increased customer demands." If the service is effecting a reduction of personnel, how can you justify an increase in these services because of "increased demand?" To result in a net increase in customer demands, with the reduction in personnel that is taking place, there must be an enormous demand building up. Would you please explain what this demand is and why it hasn't been recognized prior to now?

General ARMSTRONG. The reduction of Marine Corps personnel strength represented by the young, unmarried Marine, who seldom used his commissary privilege during the past, has no impact on demands in the stores. The increase in demand has been recognized and sales have been increasing each year. The primary reasons for this increase are as follows:

First, increased customer population in areas where commissary stores are located. Retired personnel, widows, 100 percent disabled veterans, and personnel from the other armed services have gradually increased each year.

Second, considering the shrinking value of the food dollar and the semifixed nature of military and retired pay, the commissary privilege has become one of the most valuable fringe benefits provided by law to military personnel. Yet, to varying degrees, depending on the location, the marine or his family must frequently spend excessive time in competing with his fellow customers for access to the store and room to shop. It is significant that in spite of these difficulties, more and more authorized patrons are seeking to exercise their privilege. Many in the past, however, lacked either the time or stamina to consistently patronize the stores. This group that was previously purchasing in commercial food stores are currently spending the maximum amount in commissary stores due to the significant savings offered by the commissary.

EQUIPMENT FOR MILITARY CONSTRUCTION

Senator YOUNG. At the bottom of page 2–16 you mention an increase of $5.9 million for MILCON projects being completed during 1973. Would you please tell the committee what sort of collateral equip-

ment you are referring to and why it has to be budgeted in this appropriation and not the MILCON appropriation?

General ARMSTRONG. The collateral equipment to be procured will provide outfitting for bachelor enlisted quatrers and a tactical data system support facility (a centralized facility, supporting both ground and aviation oriented command and control systems). The sort of items referred to are furniture, furnishings and equipment such as bunks, mattresses, tables, lamps, desks, chairs, office machines, file cabinets, supply lockers, et cetera. These are budgeted under this appropriation since they are considered to be movable, nontechnical expense-type items, while MILCON funds only items which are built in during the construction of the facility.

Senator YOUNG. In the same item you mention a reduction to offset the increase in MILCON of $2.2 million, which is to be taken from the bachelor furnishings account. Would you please explain this decrease?

General ARMSTRONG. The $2,217,000 decrease in funds for furniture and furnishings results from total funding of $1,366,000 in fiscal year 1973, as compared with $3,583,000 in fiscal year 1972. The fiscal year 1973 request was reduced below requirements in order to permit inclusion of other higher priority items in the budget.

MAINTENANCE OF REAL PROPERTY FACILITIES

Chairman ELLENDER. On page 2–17 you indicate that $72,000 additional is required for the maintenance of real property facilities. Would you please tell the committee how much you are already asking for this purpose and exactly what this additional $72,000 will provide?

General ARMSTRONG. The amount requested for budget project 2B: Base operations is $26,454,000. The $72,000 increase is the net result of a number of offsetting factors such as increased costs of local maintenance due to new plant additions and decreased facilities projects as the high priority air station projects are accomplished.

Chairman ELLENDER. The second item on page 2–17 is an increase for utilities support and electrical equipment for new facilities completed with MILCON funding. How is it that the expenses that you are requesting this increase for were not included as part of the MILCON request? Please explain this to us.

General ARMSTRONG. The military construction program does include air conditioners and electrical power equipment in new facilities. The Operations and Maintenance, Marine Corps increase is to provide the utilities used in these facilities and consumable supplies and material required for operation of supporting utility plants.

CURRENCY REVALUATION INCREASES

Senator YOUNG. The currency revaluation figure of $1 million strikes me as being quite high in relation to other revaluation estimates that we have received. Would you please explain how you arrived at this figure?

General ARMSTRONG. Currency revaluation cost increases as presented in the budget for fiscal year 1973, are based on a coordinated

Department of Defense budget decision. This resulted in application of uniform rate increases by country for each appropriation request involved. The rates used for budget presentation were those prevailing on the New York market as of December 3, 1971. Increases in the rate (unbudgeted) have since occurred.

The increase of $1 million in Operation and Maintenance, Marine Corps, 1973, added to the fiscal year 1972 estimate of $0.7 million, results in a total of $1.7 million in fiscal year 1973, due to revaluation. Additional costs due to revaluation are at Marine Corps Air Stations, Iwakuni, Japan, and Futema, Okinawa as well as at the Marine Corps Base Camp Butler, Okinawa. The monetary unit involved is yen. Application is as follows:

[Dollars in millions]

	Before revaluation	After revaluation	Budgeted increase
Labor involving a total of 2,510 foreign national civilian personnel	$9.7	$10.7	$1.0
Other material and services	6.0	6.7	.7
Total	15.7	17.4	1.7

REPLACEMENT OF OBSOLETE EQUIPMENT

Chairman ELLENDER. The next item of increase that I would like to address is the one for $529,000 for the replacement of wornout property. I thought there were funds set aside for this purpose in the base budget. Would you please tell the committee how much is in the base budget for this purpose? Would you also please tell the committee exactly what this increase is requested for?

General ARMSTRONG. The base budget, to which you refer based on a constrained fiscal year 1972 level, contains $327,000 for plant property, which is $923,000 less than fiscal year 1971. This increase will allow for essential replacement of obsolete and unserviceable equipment such as engineering, buildings and grounds maintenance, medical and dental, airfield, security (portable traffic signals), supply handling and vehicle maintenance equipment.

BIANNUAL FORCE INSPECTIONS

Chairman ELLENDER. On page 2–18 in regard to the command request, you indicate that an additional $66,000 is necessary for increased travel requirements associated with the biannual force inspections. Would you please tell us about these inspections, their purposes, scope, and the like.

General ARMSTRONG. The increase is associated with FMFLANT inspections of subordinate commands conducted on a biannual basis. The fiscal year 1973 inspection will involve 68 persons at various times during the year at a total cost of $66,000. This compares with 150 persons and a cost of $50,000 participating in the fiscal year 1971 inspections. The increased costs are the result of an increased and more extensive inspection schedule and of decreased availability of suitable government billeting. These inspections are a necessity for satis-

factory command control. They allow objective observation of progress toward CMC and CG FMFLANT goals, and enable timely resolution of problems which might otherwise go undetected or become more serious.

COMMAND TRAVEL

Chairman ELLENDER. Would you also please tell us how much is already in your travel budget for command and explain why what you already have is not sufficient?

General ARMSTRONG. Our fiscal year 1972 travel budget in command was $875,000. As previously mentioned additional funds are required to support an increased and more extensive inspection schedule compounded by higher per diem costs as the result of decreased availability of suitable government billeting.

INTELLIGENCE AND COMMUNICATIONS

CRYPTOLOGIC TRAINING UNITS

Chairman ELLENDER. On page 2–20, you indicate that an additional $28,000 is required for travel "in connection with cryptologic training of units returning to a full peacetime schedule * * *." One would think that the activity would be greater in wartime than in peacetime, yet you are requesting this increase. Would you please explain why your travel requirements have increased at this time?

General ARMSTRONG. The increase is for travel and temporary duty in connection with training. The increase results from return in our Pacific area units to a normal peacetime training level. One of our units which supports the entire Pacific area is based in Hawaii and as normal unit training resumes this unit will be required to send detachments to provide support for large-scal exercises in California and Okinawa. In addition, this unit will also be resuming a full peacetime unit training program of its own which involves sending detachments to forward areas for live environment training.

TRAVEL INCREASE

Chairman ELLENDER. Would you also please tell us why this increase for travel is so large? Comparing this to the normal travel budget, what does this increase represent percentagewise?

General ARMSTRONG. The increase reflects the demand for cryptologic support of FMF exercises and planning; $28,000 represents an 8.5-percent increase in the travel funds of this budget activity.

SUPPLIES AND EQUIPMENT MAINTENANCE

Senator YOUNG. The travel increase is partially offset by a decrease in supplies and equipment maintenance due, no doubt, to the reduced activity. Would you please explain this decrease and tell the committee how much this leaves you with for this purpose in the 1973 budget?

General ARMSTRONG. The decrease in maintenance costs results from replacement of older equipment with new which require less maintenance. The total of maintenance and supplies is $389,000.

OPERATING EXPENSE INCREASE

Chairman ELLENDER. The other intelligence programs request is increased by $9,000 over the 1972 estimate due to increase operating expenses for support of personnel assigned to intelligence and security activities. I realize this a a small increase, but would you please explain why these operating expenses have increased and, specifically, what operating expenses you are referring to?

General ARMSTRONG. This increase is for the Marine Barracks at the National Security Agency, Fort Meade, Md. Costs for sewage, refuse and utilities will rise during fiscal year 1973 by approximately 6 percent. This accounts for $3,000 of the requested increase. The procurement and replacement of garrison food preparation and service equipment amounts to $2,000, and will provide for an electric charbroiler, electric griddle, a rinser/sterilizer, and a butter dispenser.

The other $4,000 increase is to support the newly formed rifle and pistol teams. Funds requested will provide for registration fees for 24 rifle matches and 51 pistol matches, plus the TAD and other incidental expenses for the teams. The primary goal is to continue building teams strong enough for national competition.

GUARD AND RESERVE

REAL PROPERTY MAINTENANCE

Chairman ELLENDER. The total request for "Guard and Reserve" is $396,000 less in the 1973 budget than it was in 1972, but this is entirely due to one large decrease of $1 million related to maintenance of real property facilities. Would you please explain to the committee how you are effecting a reduction in the maintenance of these real property facilities? What specific facilities are you referring to?

General ARMSTRONG. The average yearly requirement for maintenance of real property is approximately $400,000. In prior years, full funding for this requirement has not always been possible, which caused a backlog of essential maintenance of $410,000 to occur. The $1 million was a one-time requirement for Project Volunteer funds to eliminate this backlog and to provide habitability improvements of the training centers, such as modernizing heads, lighting systems, interior painting, ceiling, deck, and wall repairs. The $1.0 million was distributed to the reserve training centers throughout the six Marine Corps districts based on current backlog and existing habitability conditions. The budget request for fiscal year 1973 is $435,000 for maintenance of real property which will provide funds for current maintenance and prevent a backlog of essential maintenance.

TRAINING FACILITIES

Chairman ELLENDER. You are requesting an increase of $50,000 for increased operating expenses of training facilities. Would you please explain this increase in detail? In your response would you please indicate how much is already in this request for the operation of these facilities?

General ARMSTRONG. The increase is due to full-year utility cost of 80 Reserve recruiting offices during fiscal year 1973 at a cost of $48,000 and 1-month utilities during fiscal year 1972 at $4,000 for a net $44,000 increase. There was also an announced increase in rent and utilities at the following existing locations: increased utilities assessment at Marine Air Reserve Training Unit, Lincoln, Nebr., $2,850; increased electricity cost of 5 percent at Marine Air Reserve Training Unit, Chicago, Ill., $150; rental of storage lot in Peoria, Ill., $2,400; and rental of State National Guard training area at Camp Atterbury, Ind., $600. Total increase for existing locations is $6,000. There is $642,000 in the fiscal year 1973 budget request for the operation of facilities; an additional $435,000 is included for maintenance requirements.

OFFICIAL MAIL REIMBURSEMENT

Chairman ELLENDER. Would you also explain the increase of $90,000 for official mail reimbursement to the Postal Service and tell us what the total amount is for this purpose as given in this budget?

General ARMSTRONG. The increased cost of official mail is due to increased postal rates based on a sampling of mail volume. There is $359,000 in this budget for cost of official mail in support of the Marine Corps Reserve.

HIRE OF TRANSPORTATION

Chairman ELLENDER. I would also like you to explain the $50,000 increase requested for the hire of transportation in support of local field training and reserve recruiting.

General ARMSTRONG. The increase is required for hire of commercial transportation in support of local field training which could not be funded during fiscal year 1972. Field training exercises during weekend training include unit exercises, battalion exercises, joint air/ground exercises, and rifle qualifications. Most Marine Corps Reserve units do not have organic transportation equipment to transport them to local field training, however, the units that have their own equipment do utilize it.

4TH MARINE AIRCRAFT WING TACTICAL DATA SYSTEM

Chairman ELLENDER. Finally, in regard to the Guard and Reserves on page 2–24 you indicate that an additional $57,000 is required for full operation of the 4th Marine Aircraft Wing Tactical Data System. How much are the operational costs for this data system if you include this increase? What has been the utilization rate up until now and what do you expect it will be if you receive this additional funding?

General ARMSTRONG. Total annual operating costs for the Marine Tactical Data System are $110,000. The Marine Tactical Data System became fully operational in February 1972, and only selected components could be utilized prior to that time. It is anticipated that the Marine Tactical Data System will continue to be fully operational through fiscal year 1973.

Senator YOUNG. Please outline the functions of this data system and tell us how effective it has been in fulfilling these functions.

General ARMSTRONG. The Marine Tactical Data System program developed equipment which has provided the Marine Corps with the

mobile, land-based, tactical, semiautomatic air defense and control facilities required for the conduct of modern antiair warfare and air traffic control. The equipment is modular in design and can be phased ashore in increments, which provide a systematic buildup in air defense and control capabilities, during all phases of an amphibious assault. Marine Air Control Squadron–4, the first FMF unit to receive Marine Tactical Data System equipments was deployed by ship to Vietnam in May 1967 and emplaced in the Danang complex in June to assume full operational responsibility in July. Marine Air Control Squadron–4 installed the first mobile land-based semiautomatic tactical air control and defense system in history to operate in a combat zone. In July 1967 the unit established a full two-way automatic digital data link with Naval Tactical Data System ships and airborne tactical data system aircraft of Task Force 77 in the Tonkin Gulf. This marked the first time that two tactical data systems operated via a digital data link. During the first year of operation, this squadron provided air traffic control to over 100,000 aircraft in all types of weather and controlled over 1,500 practice intercepts with a 92-percent success rate.

CENTRAL SUPPLY AND MAINTENANCE

Supply Support

Chairman Ellender. In regard to your supply depot operations, I see on page 2–28 that you are requesting an additional $343,000 for, "supply support for care of materiel in store, preservation and packaging of materiel in store and shipment to be performed by the depot maintenance activities." This sounds to me like the normal function of the depots and I wonder why there should be an increase in this activity when the supply load should have been decreased due to the withdrawal of the marines from Southeast Asia. Would you please explain why this increase is necessary? Would you please indicate in your response how much is in the base budget for this purpose and why that amount is not sufficient for the purpose you cited?

General Armstrong. Yes, sir. The base budget contains $4,224,000. The additional $343,000 is directly related to our withdrawal from Southeast Asia and is required to cover the additional assets gained from the WestPac rollback of equipment now to be maintained by the supply centers.

Inventory Control Points

Chairman Ellender. With regard to your inventory control points, on page 2–29 you indicate that an increase of $135,000 is necessary for printing publications. Would you please tell the committee how much is in the base budget for this purpose and precisely why this increase is necessary? Why couldn't this increase be absorbed in the base budget?

General Armstrong. The base budget, and the fiscal year 1972 budget contains $108,000. This is $92,000 less than the fiscal year 1971 budget. This increase of funds is required to restore operations to the fiscal year 1971 level and cover additional requirements. The increase is required for the following purposes:

Printing of publications to support new equipment, 197 new publications.

Revision to existing publications, 583 revised publications.

Reprinting of publications, 384 publications.

Preparation of Marine Corps changes to other services equipment-support publications adopted for Marine Corps use, 91 publications.

Supply Base Operations

Chairman Ellender. In regard to your supply base operations, I notice on page 2–31 that you are requesting increases for various items that I would like to inquire about. The first of these is an increase of $100,000 for the rental of magnetic selectric typewriters and visual research microfilm for command micromation programs. Would you please tell us how much of the $100,000 requested is for each of these two programs and also explain exactly what these funds will provide for?

General Armstrong. The breakout of the cost is:

(*a*) For rental of visual research microfilm for micromation programs ($97,000). This includes rental of microfilm viewers and printers ($25,000) and rental of fast copy equipment for communication centers ($72,500).

(*b*) For rental of magnetic selectric typewriters, $2,500.

The microfilm viewers and printers are required for the continued support of the Micromation program initiated in fiscal year 1970. Briefly, the micromation program is the conversion of computer tapes and cards to microfilm. Examples of this conversion are: allotment accounting history, procurement history files, billing files, and document control files. Data from an extensive volume of computer records that have been converted to this record storage mode would be irretrievable without the microfilm viewers and printers.

The fast copy equipment for communication centers is required in view of the volume of message traffic being handled with outdated equipment.

The magnetic selectric typewriters are used in all administrative functions. The typewriters possess a storage capability (magnetic tape) for instant recall.

Centrex Telephone System

Chairman Ellender. There is also an increase of $41,000 for the increased costs of the centrex telephone system installed in your various facilities. What is the reason for this increase?

General Armstrong. The centrex telephone system is in full operation at the Marine Corps Supply Center, Barstow, Calif., and was recently installed at the Marine Corps Supply Activity, Philadelphia, Pa. The increase is based on a study of the old telephone systems operating expenses for the past 2 years at Barstow, plus known cost increases as defined by the Continental Telephone Co. The increase is based on known costs defined at Philadelphia by the telephone company.

Senator Young. There is another item on page 2–31 that deals with another increase for printing. Why is there such a surge of requests for increases for printing? How much is already in the budget for this printing?

General Armstrong. The $34,000 increase for base operations printing and reproduction covers contract field printing at Marine Corps

Supply Center, Albany, Ga.; Marine Corps Supply Center, Barstow, Calif.; and Marine Corps Supply Activity, Philadelphia, Pa., and results from a low funding level in fiscal year 1972 which caused a drawdown of forms and deferment of other printing.

Photostating of technical drawings, while being done in fiscal year 1972 in a limited amount, may now be accomplished at a full operating level.

The base budget includes $80,000 for base operations printing and reproduction costs.

BACKLOG OF MAINTENANCE

Chairman ELLENDER. There is an item of increase of $141,000 for maintenance for real property facilities that is "primarily to reduce the backlog of maintenance." Would you please indicate how much of this increase is for reduction of the backlog and how much is for regular maintenance? Would you also please indicate how much is in the base budget for this purpose?

General ARMSTRONG. Due to price and wage increases, it now appears that all of the $141,000 increase will be needed for regular maintenance. If possible part of the increase will be used for facilities in the backlog.

The base budget contains $3,154,000 for this program.

Senator YOUNG. What specific facilities are included in the backlog category and how much is required for each?

(The information follows:)

MCSC, Albany

Work description:	*Cost in thousands*
Repair fire alarm system	$130.0
Repair six elect substations	22.0
Repair railroad fourth increment	196.0
Total	348.0

MCSC, Barstow

Repair paved roads and parking third increment	160.2
Replace 50 power poles	14.3
Paint exterior of warehouses	32.0
Replace boiler No. 11, 12 and 24	66.0
Repair perimeter fence (Nebo)	39.0
Overlay M.T. school parking lot	10.4
Replace dry pipe valves	200.0
Chip and seal storage lots	454.3
Seal and stripe asphalt streets	28.5
Repair paved roads and parking fourth increment	75.2
Repair paved roads and parking fifth increment	113.5
Gunite erosion around building 41	10.0
Exterior paint and provide inspection hatch	22.6
Total	1,226.0

MCSA, Philadelphia

Repair roof	18.7
Exterior paint pointing and seal coat	12.8
Repair roof and seal coat	11.5
Total	43.0
Grand total	1,617.0

CONTRACTUAL SERVICES

Chairman ELLENDER. Item No. 9 on page 2–31 for an increase of $243,000 needs to be broken down some before we can really see what it is all about. Would you please indicate how much of the increase is attributable to each of the reasons that you give in the description and tell us exactly what the increase in each will provide for?

General ARMSTRONG. The $243,000 increase is attributable to contractual services, rental and maintenance charges ($145,000) and supplies ($98,000) to support increased data processing incident to the Marine Corps Unified Materiel Management System (MUMMS) and other supply base operations. The contractual services and rental charges apply to three remote terminals ($43,000) and a microfilm-recorder ($12,000) at the Marine Corps Supply Activity in Philadelphia, $24,000 for commercial training programs in programming and operations analysis at the Marine Corps Supply Center at Barstow, Calif., and $66,000 for the Marine Corps Supply Center, Albany, Ga., which is an adjustment to reflect the full cost of data processing at the center. The increase in supplies reflects increased requirements for magnetic tape ($27,000), disk packs ($19,000), the acquisition of tab cards ($23,000) and paper/labels $29,000) primarily at the Marine Corps Supply Activity, Philadelphia, Pa.

Chairman ELLENDER. The same situation comes up in regard to item No. 10 on page 2–31. Would you please break out the amounts requested for each of the contractual services for which increases are requested? Would you then please indicate how much is in the base budget for each and explain why the increases are necessary in each specific instance?

General ARMSTRONG. The increases requested for each of the contractual services are: janitorial services $19,000, maintenance of office machines $9,000, repair to railway equipment $14,000, and tuition costs for IBM training courses $14,000. The base budget contains $262,100 for janitorial services, $91,200 for office machine maintenance, and $7,600 for IBM tuition costs. The repairs to railway equipment is a non-recurring cost for overhaul of a locomotive used in the traffic function at the Marine Corps Supply Center, Barstow, Calif. The increase for janitorial services is for contract services previously performed by military personnel at the Marine Corps Supply Center, Albany, Ga., and Barstow, Calif. As a result, the military personnel will be available for other duties.

The funds for maintenance of office machines are required to keep the machines in proper working condition, to preclude greater deterioration and necessitating complete replacement at an earlier date.

The additional tuition costs are for courses not scheduled during fiscal year 1972. Some of these courses are: Communication system design and analysis, system control for programmers, communication access methods programing and operations, and program management.

SUPPLY BACKLOG

Chairman ELLENDER. With regard to the request for $481,000 additional to reduce the backlog of unfilled requirements for certain supplies, have these requirements been confirmed as still existing?

General ARMSTRONG. During a recent staff visit to the supply activities a reassessment of the unfilled backlog was conducted and the requirement still exists.

CONSUMABLE SUPPLIES

Senator YOUNG. Exactly how much is being requested for each type of consumable supplies and how much is in the base budget for these items?

General ARMSTRONG. Requirements are determined by functional category. Categories for which increased consumable supplies are required are base services such as laundry and motor transport, administrative operations and medical operations. A summary of the base budget and requested increase for each of these categories follows:

[In dollars]

	Base budget	Increase
Base services	795,000	173,000
Administrative operations	512,000	277,000
Medical operations	85,000	31,000
Total	1,392,000	481,000

FIFTH ECHELON MAINTENANCE

Chairman ELLENDER. With regard to the other logistics support and the depot level maintenance of equipment in particular, can you tell us why you are requesting an increase of $873,000 for fifth echelon maintenance in 1973? In your response, would you please tell us how much you normally allocate for this purpose?

General ARMSTRONG. The purpose of this program is to overhaul, rebuild and return unserviceable assets of principal end items and secondary reparables to a serviceable condition through the use of fifth echelon maintenance. The scope of the program is determined by the requirements necessary to meet inventory objectives, after an evaluation of serviceable assets available and planned procurements.

Program variations from year to year are a direct result of projected stock availability, planned procurements, introduction or phaseout of selected equipments, and changes in total force equipment allowances.

An increase of $873,000 is required to meet the minimum equipment inventory objectives to maintain a viable Marine Corps readiness posture. The program will fluctuate from year to year depending upon the number of items available for rebuild, however, previous allocations for this program have been fiscal year 1971, $28,717,000; and fiscal year 1972, $18,976,000.

CONTRACT ENGINEERING

Chairman ELLENDER. In the area of centrally managed support, there are two items of increase that are not at all discretionary that I would like to inquire about. The first is with regard to the increase of $919,000 for contract engineering and for support of equipment previously supported under the procurement appropriation. Would you please tell us what this is and explain what these increases will provide?

General ARMSTRONG. The increase will provide contract engineering services for the following items:

AN/TYQ–1, Tactical Air Command Control.
AN/TPS–32, Radar Set.
15A19, Marine Tactical Data System Trainer.
AN/TYA–20, Compatibility Computer Group.
AN/TYA–17, 19, 24, Associated Equipment for Marine Tactical Data System.

These items are primarily marine tactical data system components and are utilized for air control, fire distribution and control, and require data-link communication components. The increase in Operation and Maintenance, Marine Corps (O. & M.M.C.), is a direct result of the shift from Procurement, Marine Corps funding. Technical representatives are funded by the PMC appropriation for 1 year after equipment delivery or after a major modification. Subsequently the funding is by the O. & M.M.C. appropriation.

Official Mail Increase

Chairman Ellender. Would you also please tell us about the increase of $948,000 for the increase in the cost of official mail?

General Armstrong. Title 39, United States Code and U.S. Postal Service Manual require departments, agencies, and establishments of the U.S. Government to reimburse the U.S. Postal Service for postage fees on mail which is not prepaid by affixing postage stamps, operation of postage meters, et cetera. Reimbursement is to be in amounts "equivalent to the amount of postage and fees due on their mail for which the U.S. Postal Service does not otherwise receive compensation."

Postage and fees on mail are not prepaid by use of stamps, meters, et cetera. Therefore determination of amounts to be reimbursed for official mail has been accomplished by conducting a sample of mail volume approximately every 3 years. When an amount has been established and included in a budget such amount has been considered as the cost reimbursable to the U.S. Postal Service until a new sampling has been performed and included in the appropriate budget, or otherwise known changes have been accommodated. In view of the budget phasing required there generally has been about 1-year delay before the revised amount based on a new sampling or other known changes could be budgeted and funded for reimbursement to the U.S. Postal Service. The budget estimates for fiscal year 1973 are based on a mail sampling from May 15 through June 15, 1971. The previous sampling was conducted 3 years earlier during fiscal year 1968. Accordingly costs based on the new sampling have been incorporated into the fiscal year 1973 estimates and are shown as an increase, since the fiscal year 1972 budgeted amount has not been increased. The fiscal year 1972 budgeted amount under project 7D, "Other logistic support," is $2,871,000. The increase of $948,000 for fiscal year 1973 is due to the postal rate increases since the previous sampling in fiscal year 1968.

Training Medical and Other General Personnel Activities

Recruit Training

Chairman Ellender. In regard to "Recruit training," on page 2–38 of the justification, you indicate that an increase of $522,000 over and above the amount already provided is necessary for real property

maintenance. Would you please tell the committee how much is already provided, excluding this requested increase, and explain exactly what this increase is for and why it is necessary?

General ARMSTRONG. The amount already provided in the base budget, or fiscal year 1972 level, is $2,840,000. At this level the backlog of essential maintenance will increase. This increase will be used to prevent an increase in the backlog of essential maintenance above the fiscal year 1972 level.

OTHER SUPPLIES

Senator YOUNG. Another increase, this one for $226,000, is requested for additional support required in "Other supplies." Later you indicate that the recruit input will be lower this year and I wonder what is the need for these "other supplies"? What supplies are you referring to and why are they necessary if the recruit load is to be less than last year's?

General ARMSTRONG. This amount is required to restore levels of materiel drawn down during fiscal year 1972 which are necessary for efficient training and base operations. Requirements for consumables and other supplies are needed for all functions and are recurring in nature and not directly related to the actual number of recruits being trained, since the functions must continue even if there are fluctuations in load. Included would be medical and dental supplies; petroleum, oil and lubricants; tools and tires from motor transport; training aids and library books; photographic supplies; housekeeping supplies for bachelor quarters; and other areas such as packing and crating material; office and janitorial supplies.

SPECIALIZED TRAINING

Chairman ELLENDER. On page 2–40 you list a number of increases in the specialized training field. One of these programs is a drug abuse program for which an additional $683,000 is requested. Would you please explain what your program is and what this level of funding will provide. Specifically, what will these funds be used for?

General ARMSTRONG. Yes, sir. The Marine Corps drug abuse program encompasses all aspects of drug abuse prevention through training, education, and information; treatment and rehabilitation and enforcement. To accomplish the prevention and rehabilitation aspect of the overall program will require formal training to provide commands with the paraprofessional personnel who are knowledgeable about drug abuse education and information programs. The total training requirement will be in excess of 500 marines with 100 percent turnover of trained personnel occurring approximately every 2 years. Training equilibrium should be achieved by the end of fiscal year 1974.

Of the requested $683,000, $250,000 will be used toward the production of a drug abuse film in connection with the drug abuse counseling program. This film will be oriented toward new and young marines, depicting why drug involvement cannot be tolerated where the team concept is employed, and the necessity of maintaining a state of readiness within the Marine Corps. $237,500 is required to train marine officers and enlisted personnel at the National Drug Education Center. This training is in preparation for assignment to duty on drug abuse contact teams, and provide them with the paraprofes-

sional training required to develop local command drug abuse control programs.

Reference books for the drug abuse counselors, information pamphlets, and publicity posters will require $150,000 of the $683,000.

Funds of $ $45,600 will be necessary in order to send 48 enlisted marines to the Navy Drug Specialist School. This school will provide training in the fields of lecturing, counseling, and program developers.

TANK DRIVER TRAINING

Chairman ELLENDER. You also request an additional $42,000 to modify 10 tank driver training devices. Would you please tell us why this is necessary and why it costs so much?

General ARMSTRONG. Modification of tank training devices has not kept pace with the modifications incorporated in our M–48 tanks. None of the modifications are major; however, there are a number of changes necessary to insure the training devices mirror the actual tank to as great an extent as possible. The M–48 tank will not be phased completely out of the regular establishment until fiscal year 1977, and it is planned to equip the Marine Corps Reserves with the M–48. The modified tank driver training devices will be of great use to both the regular and reserve establishment as there is little difference between driving an M–60 tank and driving the current model of the M–48. Based on this fact, the Marine Corps has no plans to buy a tank driver training device for the M–60 tank.

Costs include prototype modification and production modification for the 10 devices, installation and labor costs are included in the estimates. The cost is related to the highly technical nature of the modifications involved requiring skills in the electronics, optical, and communications area, plus the requirement for initial prototype modification and development of production modification kits for the 10 items.

INSTRUCTIONAL TELEVISION

Senator YOUNG. An increase of $46,000 is requested for the maintenance contract for instructional television (ITV) equipment delivered last year. Would you please tell us what this ITV program is and why the maintenance contract for this had not been provided for in the base budget?

General ARMSTRONG. During the past 6 years, the Marine Corps has spent considerable effort studying and evaluating instructional television (ITV) and its application to Marine Corps training requirements. At present, the Marine Corps use of this media is extremely limited. Nevertheless, current procurement efforts will place ITV systems throughout the Marine Corps training establishment. These systems will become operational during fiscal year 1973. The increase of $46,000 for a maintenance contract is a new requirement that commences in fiscal year 1973 and which was not a requirement in prior fiscal years.

OTHER TRAINING ITEMS

Chairman ELLENDER. One item for the increase of support for specialized training courses and of supplies needs to be broken down a bit further. The total increase requested is $504,000. Would you please

tell us how much of that increase is for the expanded support of the training program and how much of it is for provision for supplies?

General ARMSTRONG. $200,000 of the $504,000 requested for fiscal year 1973 is required to support the new training. $304,000 to be applied to supplies and materials for the established training courses. These funds will be used for training instructional aids, student and office supplies, individual equipment worn out in service, range targets, tires, tools, et cetera, and will provide increased support for training already in effect.

SPECIAL TRAINING COURSES

Chairman ELLENDER. Would you also please tell the committee exactly what sort of expanded support of specialized training courses this increase will provide? Please be specific.

General ARMSTRONG. The introduction of new training courses during fiscal year 1972 results in continuing and additional costs for full year funding of expanded training support during fiscal year 1973.

The following actions during fiscal year 1972 contribute to the increased requirement:

The establishment of a recruiter's school at Marine Corps Recruit Depot, San Diego, Calif.

The establishment of a Marine Corps Human Relations Instructor School at Marine Corps Recruit Depot, San Diego, Calif.

The amplification of "Occupational field 01, Personnel and administration" training courses at Marine Corps Recruit Depot, Parris Island, S.C.

EXPANDED TRAINING OPPORTUNITIES

Chairman ELLENDER. The last item with regard to specialized training that I wish you would explain is the increase of $768,000 for "Expanded training opportunities and increase per diem expenses related to adequacy of quarters." Would you please explain what you are referring to in regard to the expanded training opportunities and how much of the increase you plan to expend in this effort?

General ARMSTRONG. By expanded training opportunities we are referring to an increase in the number of marines undergoing training involving their military occupational specialty. In fiscal year 1973, the Marine Corps plans to send approximately 1,400 more marines to formal schools than in fiscal year 1972. This increase in the number of personnel going to school accounts for $326,000 of the increase.

PER DIEM INCREASES

Chairman ELLENDER. Would you also tell us how much of the increase requested will be for increases in per diem expenses and how and why the increase was derived and approved.

General ARMSTRONG. $442,000 will be for increased per diem expenses. These increases are not generated internally within the Marine Corps but reflect per diem rates set down in the joint travel regulations and decisions by the individual services on the adequacy of quarters. An increasing number of quarters are being declared inadequate requiring the payment of higher per diem rates to those individuals not utilizing Government quarters and messing facilities.

PROFESSIONAL TRAINING

Senator YOUNG. With regard to the professional training, I notice on page 2–41 that there is an increase requested of $170,000 to convert military billets to civilian billets for printing at Quantico, Va. Would you please tell the committee why you would like to convert these billets and how many are involved?

General ARMSTRONG. Yes, sir. We have found that certain lithographer positions in the printing plant at the Marine Corps Development and Education Command, Quantico, Va., and also at Camp Lejeune utilize skills that are not required anywhere else in the Marine Corps. Consequently it was considered to be more suitable to train and utilize civilians for these tasks than military personnel. There are 43 of these positions at Quantico which do not require military skills.

Senator YOUNG. Would you also please provide for the record the number of civilian billets this conversion would create and what the grades would be?

General ARMSTRONG. Yes, sir. The 43 billets to be converted on a 1-to-1 ratio are four GS–4's, one GS–6, one GS–7, one GS–9, and one GS–11. The remaining 35 are ungraded positions.

ARCHITECTURAL AND ENGINEERING FEES

Chairman ELLENDER. Item No. 7 on page 2–41. I would like to know what the additional architectural and engineering fees are for.

General ARMSTRONG. The additional architectural and engineering fees are for engineering studies and design for base support and for contract preparation beyond the capacity of the Public Works Department at Marine Corps Development and Education Command, Quantico, Va. In the last year, Marine Corps Development and Education Command, Quantico, Va., has experienced an 8-percent reduction in engineering staff personnel coupled with an increased engineering workload. The additional funds are required to compensate for these two factors by providing increased capacity to contract for engineering services.

TECHNICAL PUBLICATIONS

Chairman ELLENDER. I would also like to know about this increase of $9,000 for magazines and newspapers. How much is already in the budget for this purpose and why is this large increase necessary?

General ARMSTRONG. There is $6,500 in the budget now for magazines, newspapers, and technical publications. The increase in this area is required to augment the education center library and the Marine Corps Technical Library with new publications, plus cover the increased subscription rates for other publications.

GUEST LECTURERS' FEES

Senator YOUNG. With regard to the $11,000 increase in guest lecturers' fees, would you please tell the committee how much is already provided in the budget for this purpose and exactly why there is a need for this increase? Please be very specific—will it provide for more speakers or have the fees gone up?

General ARMSTRONG. The basic budget contains $2,100 which will accommodate only 12 to 25 guest lecturers. For a well-rounded educational program and to maintain a high level of expertise background for the various professional training programs, it is desirable to bring in 74 lecturers for fiscal year 1973, at an approximate cost of $13,000.

The requested increase will provide for additional lecturers and educators from various colleges and universities. Some of the planned topics for the various schools at Marine Corps Development and Education Command, Quantico, Va., are as follows:

Command and staff college:
- Leadership.
- Effective writing.
- Communism.
- National security.
- Military strategy.
- Public relations.

Amphibious warfare school:
- Counterinsurgency.
- Amphibious warfare.

Computer science school:
- Computer science.

Physical fitness academy:
- Sports medicine.
- Endurance techniques.
- Close combat.
- Physical conditioning.

Education center:
- Military history conference which will bring in eight historians from various universities.

MARINE CORPS DEVELOPMENT AND EDUCATION COMMAND

Chairman ELLENDER. Item 11 on page 2–42 appears to be similar to other increases we have noticed and that you have explained with regard to bringing up the level of materiel funding. Again I would like you to explain what this increase is, why it is as large as it is, and specifically what the funds will be used for?

General ARMSTRONG. All of the funds requested are for Marine Corps Development and Education Command, Quantico, Va., and are required in order to provide the minimum amount of stock necessary for the satisfactory and successful performance of the command's mission. Due to a low funding level in the prior year, it is mandotory to expend this amount to rebuild the supplies and materials stock in order to prevent further degradation of the professional training program.

Included in the amount of increase are funds for training aids, text books and work materials for the education center, the basic school, and the officers candidate school. It is desirable to have the students retain certain text books and materials upon completion of their courses.

Also required are motor transport spares and repair parts; requirements for repair/rebuild of match weapons for the weapons training battalion; consumables for the base surgeon and dental office. The inventory of blankets, sheets and other organizational material should be restocked. Additional funding is required for the field printing plant and in the food service area.

Educational Opportunities

Chairman Ellender. Items 12 and 13 on page 2–42 are for increases associated with educational opportunities for enlisted personnel. Would you please tell the committee what these two programs are, how many personnel are presently enrolled in them, and what the addition of these additional funds will provide for?

General Armstrong. The program referred to in item 12, the Marine associated degree program (MADCOP), is specifically designed to serve two purposes; (1) to make the enlisted man or woman more valuable to the Marine Corps, and (2) to keep him or her in the Corps. Most applicants select courses of study which complement or supplement and extend their military occupational speciality (MOS), courses in data processing, electronics, music, accounting, police science, et cetera, and so become much more capable workers when they return to their Marine Corps jobs; and, since an individual must have completed at least 3 years of active duty before he may apply for the program and then must pay back 4 years after 2 years in school, he will be near or beyond the 10-year mark at the completion of the MADCOP and is not apt to leave the Corps. That's why we feel that the MADCOP is a sound way to invest this money. Right now 99 students are attending junior college under MADCOP. We have requested sufficient funds to pay for 277 enrollments at $928 each in fiscal year 1973.

The program referred to in item 13, the Navy Enlisted Scientific Education Program (NESEP), is the program through which the Marine Corps selects the real "cream" from the enlisted ranks and sends them to college for 4 years. Between the second and third years of school, the men are sent through the Platoon Leaders Course (PLC). The ones who successfully complete the PLC and a baccalaureate degree are commissioned second lieutenants in the Marine Corps. They are unusually well-rounded officers because they are above-average in intelligence to begin with, they are allowed to major only in one of the "hard" sciences or mathematics in college, and they have an enlisted background since one criterion for selection is to "be a corporal or above." As of April 6, 64 marines were attending college under the provisions of NESEP. An additional 50 have been selected to begin in the fall. Based on bills received from the schools involved, the average cost per student in NESEP will be $1,533 for fiscal year 1972. The additional funds which we have requested will assure the opportunity for additional young and highly intelligent marines to continue their college education, qualify for marine commissions, and provide the Marine Corps, at a time when procurement of officers is difficult, with an important source of officers who are already service-oriented.

Leasing of Recruiter Sedans

Chairman Ellender. On page 2–43, you indicated that an additional $490,000 will be required in 1973 for the leasing of recruiter sedans. Would you please tell the committee how many sedans, in total, this budget will provide for recruiters if this increase is allowed?

General Armstrong. This budget will provide for the lease of 572 vehicles during fiscal year 1973, an increase of 231 leased vehicles over the fiscal year 1972 level. This will provide for 952 sedans, owned and leased.

Chairman Ellender. Would you also compare that to the number of recruiters you will have and indicate what the recruiter/car ratio is and then explain why that ratio could not be higher, that is fewer cars for the same number of recruiters?

General Armstrong. A comparison of the vehicles of all types assigned to recruiters to the number of recruiters for fiscal year 1964—pre-Vietnam—fiscal year 1972 and project fiscal year 1973 is shown below:

	Fiscal year—		
	1964	1972	1973 proposed
Vehicles assigned to recruiters	725	1,180	[1] 1,380
Recruiters assigned	1,073	1,756	1,842
Recruiter/vehicle ratio	1.48:1	1.488:1	1.355:1

[1] Includes sedans, station wagons and vans.

It is noted that the fiscal year 1964 recruiter to vehicle ratio (1.48:1) was during a period of high draft pressure and when Marine Corps involvement in Vietnam was not a significant consideration. With the implementation of the All Volunteer Force program in fiscal year 1972 and the concurrent lessening of the draft pressure through significantly reduced draft calls, the recruiter to vehicle ratio is maintained at a level comparable to that of fiscal year 1964. For fiscal year 1973, it is assumed that draft calls will be reduced to zero by the end of the fiscal year, thus negating the draft as an inducement for service. Therefore, it will become incumbent upon the Marine Corps to apply the necessary assets to effectively contact the required number of qualified applicants to fill Marine Corps manpower needs. Studies have shown that recruiter mobility is directly related to this endeavor. Based upon information derived from these studies a ratio of 1.335 recruiter to one vehicle will provide the required mobility, and at the same time will provide optimum utilization.

Recruiting Duty Expenses

Chairman Ellender. Item No. 4 on page 2–44 for out-of-pocket expenses is for an increase of $267,000. Would you please explain this increase thoroughly? What sort of expenses are included in this category, what controls you have over them and so forth.

General Armstrong. The entitlement for reimbursement for actual and necessary out-of-pocket expenses of personnel assigned to recruit-

ing duty became effective on November 14, 1971. The fiscal year 1972 recruiting and examining budget contains $433,000 for reimbursement of these expenses. This funding will support 2,309 marines assigned to recruiting duty for the 7½ months of fiscal year 1972 entitlement at an average of $25 per month per individual.

The fiscal year 1973 budget contains $700,000 for reimbursement of 2,333 marines for 12 months at an average of $25 per month per individual.

Items authorized for reimbursements under this category are broken into the following areas:

Snacks, nonalcoholic beverages, and occasional but not frequent lunches and dinners, when purchased by the member for prospective recruits or candidates and their immediate families. In this respect, "occasional but not frequent" is construed to mean only when the situation demands such and when not providing a lunch or dinner would adversely affect the recruiting effort.

Parking fees incurred while at itinerary stops.

Official local telephone calls made while away from the office and paid out-of-pocket by recruiting personnel.

Purchase of photostatic copies of documents for prospective recruits and candidates, including birth certificates, school transcripts, diplomas, registration certificates, et cetera.

Other small but necessary expenditures related to recruiting duty that the member must pay from personal funds—for example, fees for record searches, probation record checks—for which a billing document must be provided.

Individuals claiming reimbursement under this entitlement are required to submit itemized reports to show the cost item, date incurred, and total costs. Items costing in excess of $15 must be supported by separate receipts in accordance with the joint travel regulations. The District Director or his designated representative is tasked with the responsibility of administrative certification and approval of the claims. Monthly reports of reimbursement with supporting documents are submitted to the Commandant of the Marine Corps for use in monitoring the program.

Communications Support

Chairman Ellender. In the sixth item you are requesting an additional $444,000 for communications support for new facilities. Would you please tell the committee how much you requested last year for this same purpose and how many facilities that provided for? Would you also please indicate the total for that purpose in this year's request, including the additional amount, and the number of facilities that the total will provide for? If the differential is significant, I wish you would explain it.

General Armstrong. This increase ($444,000) is for communications support of new facilities to be acquired in fiscal year 1973, full year support of facilities established during fiscal year 1972 and upgrading of communication services in existing facilities. The increase is broken down as follows:

Communication support for 35 additional recruiting offices to be acquired during fiscal year 1973. This includes such items as installation and rental of telephone instruments, rental of telephone transmitters, telephone long-distance toll calls and message service: $222,000.

Full year communications cost of 177 facilities added in fiscal year 1972: $144,000.

Increase in communication capabilities of existing recruiting offices by use of after hour answering services, facsimile, telephonic transmitters, et cetera: $80,000.

Fiscal year 1972 funding for communications is $854,000 which supports 1,023 recruiting offices.

The fiscal year 1973 request will provide $1,298,000 in communication support at 1,058 recruiting offices.

Advertising Requirements

Senator Young. You are also requesting an increase of $2.7 million for increased advertising requirements. Would you please outline your advertising objectives for this year and break down the total amount you are requesting for advertising this year, not just the increase, and explain what these funds will be used for. Please be specific.

General Armstrong. The objective of the fiscal year 1973 Marine Corps advertising program is to produce and distribute recruiting advertising materials—officer and enlisted—in sufficient quantity and of superior quality to facilitate the attainment of stated manpower goals.

The fiscal year 1973 request for $6,536,000 in advertising funds is broken down below:

Item	*(Dollars in thousands)*
Salescasters (light and motion message displays)	$7
Slide presentations for recruiter presentations	15
Exhibits and displays for schools and conventions	45
Literature racks for printed materials	34
Purchased magazine advertisements	1,891
Direct mail campaign (direct to high school and college prospects)	677
TV spot announcements	14
Radio spot announcements	91
High school advertising items (bookcovers and calendars)	19
Printing of booklets, pamphlets, and posters	1,640
Advertising agency contract	945
Newspaper production (two newspapers for PLC's and recruiters)	11
Professional sales magazine subscriptions	1
Supplies (flags, sign inserts, and so forth)	123
Transit advertising (buses and taxicabs)	353
Billboard advertising	603
Miscellaneous (direct mail envelopes, certificates of acceptance, civilian pilot training program completion certificates, decals legends for recruiting vehicles, flip charts, and so forth)	34
Recruiter excellence performance awards (plaques and certificates) presentation items (tie tacks, certificates, and so forth) for those who have assisted in recruiting, school counselor desk calendars, paper weights, desk memo boxes, portfolios, and so forth)	33
Total	6,536

PLATOON LEADERS CLASS FLIGHT INDOCTRINATION

Chairman ELLENDER. An increase of $176,000 is requested for the platoon leaders class flight indoctrination program due to increased participation. Would you please tell the committee what this program is and tell us what the participation was last year and what you expect it to be this year?

General ARMSTRONG. The program referred to is the civilian pilot training (CPT) program, which is a program similar to the flight instruction program operated by the other services in conjunction with their ROTC programs. Briefly, the program provides civilian flight instruction to members of the platoon leaders class program, which is the Marine Corps major long-range officer program—as the ROTC is for the other services. The program is designed to enhance the attractiveness of the PLC program, and to eliminate those students who, upon initial exposure to aviation training, discover that they cannot, or do not desire to, continue on to military aviation training. It was initially expected that approximately 150 PLC members would participate in the CPT program during fiscal year 1972 at an average cost of $950 per man. This would require $144,000.

However, the CPT program was not finally approved until October of 1971, and will not be fully implemented until March of 1972. The late implementation date made the program available only to college seniors, whereas during future years the program will also be available to certain college juniors. Also, a number of eligible seniors felt that there was not enough time left in the academic year for them to complete the program, so they did not apply. As a result, 65 men are participating in the CPT program during the latter part of fiscal year 1972, with the average cost per man expected to be approximately $1,000.

During fiscal year 1973, PLC members eligible for the CPT program will come from the following sources:

Senior course PLC training, fiscal year 1972: 233 report; 20 percent attrition; 183 complete.

Complete course PLC training, fiscal year 1972: 150 report; 20 percent attrition; 120 complete.

Accelerated PLC training, fiscal year 1972: 45 report; 20 percent attrition; 36 complete.

Current inventory of fully trained PLC's who will not graduate until fiscal year 1973: 17 on hand; 10 percent attrition; 15 complete.

Therefore, total eligible input for fiscal year 1973 CPT program is 354. It is expected that approximately 90 percent of those eligible would apply for the program, or 320.

At an average cost of $1,000 per man, this will require $320,000, or an increase of $176,000 over fiscal year 1972's budget.

CONSUMABLE OPERATING SUPPLIES

Senator YOUNG. Would you please tell us what item 12, requesting an increase of $262,000, is for? It seems that both of the items, increase for consumable supplies and additional recruiting personnel, have been covered already and I wonder if there is some duplication

in the request. Would you please clear this up and tell us what this request is for?

General ARMSTRONG. This increase is to provide for increased usage of consumable operating supplies during fiscal year 1973 above the fiscal year 1972 level. The 177 recruiting facilities activated in fiscal year 1972 were available for only 73 percent of the year in fiscal year 1972 due to phase in schedule but will be available for a full year in fiscal year 1973. The increase of 600 recruiting personnel phased in on a 73-percent availability basis will also be available for a full year during fiscal year 1973. This coupled with the 86 additional recruiters and 35 additional recruiting offices in fiscal year 1973, will result in an increased usage of operating supplies in fiscal year 1973. The increase requested for this purpose is not included in the other areas listed in the budget.

JUNIOR RESERVE OFFICER TRAINING CORPS

Chairman ELLENDER. Part of the increase of $207,000 requested for the Marine Corps Junior Reserve Officer Training Corps program is for $29,000 related to the operation of existing units. Would you please tell us the reason for this increase.

General ARMSTRONG. There is an increase of $10,000 to have additional literature printed to be used to help increase the Marine Corps Junior Reserve Office Training Corps enrollment at existing schools. The remainder of the increase, $19,000, will be used for travel expenses associated with a conference for Marine Corps Junior Officer Training Corps instructors. The conference is conducted at Headquarters Marine Corps in alternate years to exchange ideas on teaching methods and to improve the curriculum to keep it responsive to the needs of the student.

ACTIVATION OF UNITS

Chairman ELLENDER. With regard to the other $178,000 that is due to the activation of nine additional units, would you please tell the committee how the cost of activating these nine units compares to the cost of activating other units in the past.

General ARMSTRONG. The cost of equipping the units to be activated in fiscal year 1973 is approximately the same as the cost to equip those units activated in recent years. The $178,000 represents the operating cost of the new units for the first year at an average cost of $19,800 per school and includes initial costs for equipment. The first year cost of units to be activated in fiscal year 1973 is approximately the same as in prior years.

ADMINISTRATION AND ASSOCIATED ACTIVITIES

CIVILIANS AT FIELD HEADQUARTERS

Chairman ELLENDER. With regard to the field headquarters activities, that you deal with on page 2–48 of the justification, would you please explain why you want to convert the 78 positions at the Marine Corps Finance Center and the Marine Corps Automated Services Center to civilian positions? In explaining this, would you please indi-

cate what the present staffing is of these two facilities and the distribution between military and civilian positions.

General ARMSTRONG. Yes, sir. These additional 78 civilians are to replace marines in clerical-type positions who are performing duties that are not similar to other military administrative duties within the Marine Corps. It is more appropriate that such positions be filled with civilians. The positions at the Automated Services Center are involved in the processing of class III Reserve records while those at the Finance Center primarily process retired pay allotments. The present staffing at the Marine Corps Finance Center is 45 officers, 408 enlisted, and 245 civilians and at the Marine Corps Automated Services Center it is 28 officers, 337 enlisted, and 38 civilians.

MANPOWER MANAGEMENT INFORMATION

Chairman ELLENDER. Is item No. 6, concerning the increase of $136,000 for support of the manpower management information systems, at all related to the Marine Corps Automated Service Center that we spoke of?

General ARMSTRONG. No, sir; it is not.

Chairman ELLENDER. Would you please explain what this increase of $136,000 for the manpower management informations systems program is for and, in doing so, tell the committee how much is already in this budget for this program?

General ARMSTRONG. Manpower management information systems program (GIMMIS) requirements for fiscal year 1972 are $205,000. Due to budget limitations only $69,000 was initially budgeted for fiscal year 1972. Requirements for fiscal year 1973 are $205,000, reflecting the increase over fiscal year 1972 of $136,000.

During fiscal year 1972 GIMMIS was provided $100,000 for the operations and maintenance of the manpower management models. This $100,000 was provided outside GIMMIS budget controls resulting in an operating allocation of $169,000. The additional $100,000 provided for continued operation of manpower management models in effect since fiscal year 1971, such as personnel assignment models for $32,500, manpower planning models $41,500, and manpower requirements determination models for $26,000. During fiscal year 1973 GIMMIS will be required to continue operations as in fiscal year 1972 plus additional requirements as listed below for a net operating increase of $36,000.

Expansion of recruit assignment model	+$12,000
Expansion of officer planning model	+5,000
Improvement of the computerized occupational data analysis program	+19,000
Total	+36,000

DATA PROCESSING

Chairman ELLENDER. In item No. 8 on page 2–48, you indicate that an increase of $233,000 is necessary for data processing related equipment and supplies. Would you please explain to the committee why this additional funding is required and exactly what the additional funds will be used for?

General ARMSTRONG. This increase is the result of both new equipment installation, data storage device replecement and augmentation, and an increased requirement for certain consumable items at the Marine Corps Automated Services Center in Kansas City, Mo. These items are as follows:

Addition of an off-line micromation printer ($50,000) to provide efficient translation of data to microfilm;

Addition of a visual display system ($55,000) to provide immediate cathode ray tube (CRT) information display capability, providing improved response time, efficiency and flexibility over printed formats for use in the bond and allotment section;

Addition of two printers ($35,000) to replace two check printers that have been worn out in service;

Increase ($12,000) in punch cards and forms required for expanded operations;

Increase ($8,000) in automated data processing time contracted commercially;

Increase ($4,000) in other commercial contract services;

Increase ($19,000) in maintenance parts and equipment due to overall increase in Marine Corps ownership;

Acquisition of 74 new disk packs ($26,000) to provide for increased data storage requirements;

Acquisition of 1,500 new reels of tape ($20,000) to provide for increased data storage requirements; and

Acquisition of additional six-part paper ($4,000) for increased operations.

KANSAS CITY AUTOMATED SERVICE CENTER

Chairman ELLENDER. Would you also please tell the committee how much is already in the budget for the two activities you are requesting the funding for?

General ARMSTRONG. Yes, sir; the budget already contains $572,000 for equipment rental and maintenance and $116,000 for supplies at the Marine Corps Automated Service Center in Kansas City.

FIELD HEADQUARTERS SUPPLIES

General ARMSTRONG. Yes, sir; the increased supply support is an increase of $105,000 for "consumable supplies and services support for manpower analysis team and increased effort in disbursing and supply inspections." Would you please explain to the committee why this increased supply support and this increased effort in disbursing is needed?

General ARMSTRONG. Yes, sir; the increased supply support is required to meet increased costs associated with support of office equipment, building maintenance, printing of course materials at the Marine Corps Institute plus additional travel and per diem costs to support inclusion of maintenance inspectors on our field supply and maintenance auditors office inspection teams. The increased effort in disbursing is a result of SECNAVINST 7520.1D which directs yearly inspections of FMF units not previously covered.

Chairman ELLENDER. Would you also please explain the distribution of the increase requested for these two purposes and also what the funds are to be used for in each instance?

General ARMSTRONG. Yes, sir; the funds will be distributed as follows: $19,000 for increased costs of rental, repair, and support of office equipment, plus increased costs of building maintenance. $4,000 supports utilities requirements for recently acquired space for the Marine Corps Museum at the Washington Navy Yard; $20,000 covers increased costs for printing old and newly developed courses at the Marine Corps Institute; $17,000 will be used to rehabilitate facilities at Headquarters Battalion, Henderson Hall; $13,000 is required to support the additional travel and per diem associated with the new disbursing inspections; and $10,000 covers the travel and per diem of the new maintenance inspectors. The remaining $22,000 is for the increased effort by our manpower analysis teams.

OTHER SUPPORT ACTIVITIES

Senator YOUNG. In the category of other support activities, there is an increase of $121,000 for civilian clothing for Marines receiving discharges that don't allow them to keep their uniforms. Would you tell the committee just how much, in total, is included in this budget request for this purpose?

General ARMSTRONG. The budget includes a total of $265,000 for civilian clothing for Marine dischargees so entitled.

Senator YOUNG. I presume that the amount you are requesting for this civilian clothing is based on the number of people dishonorably discharged and so forth, is that correct?

General ARMSTRONG. The amount requested for civilian clothing is based on the number of Marines receiving dishonorable, bad conduct, undesirable, unsuitability, or inaptitude discharges who are not, by law, permitted to retain their uniforms. Also included are those enlisted personnel discharged prior to completion of recruit training under honorable conditions for dependency, hardship, minority, disability, or for the convenience of the Government. Although the law (Public Law 87–144) states that ungraduated recruits are permitted to retain only one complete uniform, appropriate to the season for wear to their homes, it is Marine Corps policy to issue civilian clothing to all ungraduated recruits as sizable monetary savings are realized, considering the fact that winter issue of the service uniform costs $94.30; whereas, the average cost per individual for the issue of civilian clothing is computed at $13.45.

Senator YOUNG. How many additional personnel in these categories will the additional funding provide for?

General ARMSTRONG. Although this budget shows an increase of $121,000 over fiscal year 1972, the fiscal year 1972 amount was deficient and required additional funding through a realinement of moneys within the budget project during our midyear review. It is estimated that 20,562 dischargees will be eligible for civilian clothing during fiscal year 1972 and that 19,700 dischargees will require civilian clothing in fiscal year 1973.

ATHLETIC EQUIPMENT

Chairman ELLENDER. Another $160,000 is requested in addition to the amount already reflected in the budget request for athletic and recreational equipment. Would you please tell the committee how much is provided in this budget for these purposes?

General ARMSTRONG. The budget includes a total of $260,000 for the central procurement of certain standard athletic and recreation equipment items.

Chairman ELLENDER. Would you also please tell the committee exactly what these additional funds will be used for and why they are needed?

General ARMSTRONG. This cost is for athletic and recreation equipment in support of the morale and welfare program and provides for certain items not carried in the Marine Corps stock fund which are considered to be more economically and practicably furnished through central procurement. The requirements are based upon estimates from field commanders as evaluated by Headquarters Marine Corps relative to established allowances. It provides for furnishing on an initial issue basis 13 standard allowance-type items such as: television sets, radios, fishing boats, outboard motors, pool and ping-pong tables, pianos, tape recorders, physical training gym sets, et cetera.

Procurement, Marine Corps

BUDGET REQUEST

Chairman Ellender. You have another presentation to make, General. The next appropriation is "Procurement, Marine Corps" for which the fiscal year 1973 estimate is $191.1 million.

PROGRAM AND FINANCING

At this point in the record there will appear certain program and financing information from the justifications.

(The information follows:)

DEPARTMENT OF DEFENSE—MILITARY—PROCUREMENT, MARINE CORPS

PROGRAM AND FINANCING

[In thousands of dollars]

	Budget plan (amounts for procurement actions programed)			Obligations		
	1971 actual	1972 estimate	1973 estimate	1971 actual	1972 estimate	1973 estimate
Program by activities:						
Direct:						
1. Ammunition	51,970	19,700	16,600	.....	16,000	18,000
2. Weapons and combat vehicles [1]	62,622	67,600	63,100	29,526	81,800	73,000
3. Guided missiles and equipment	12,800	1,100	22,100	166	4,200	25,600
4. Communications and electronics equipment	56,200	19,900	57,700	40,810	72,371	86,200
5. Support vehicles	9,800	7,900	12,800	1,430	17,000	12,000
6. Engineer and other equipment	56,034	11,900	12,800	38,564	43,000	39,200
Total direct	249,426	128,100	191,100	110,496	234,371	254,000
Reimbursable (total)	2,567	6,125	.....	506	7,906	.....
Total	251,993	134,225	191,100	111,002	242,277	254,000
Financing:						
Receipts and reimbursements from:						
Federal funds	−2,537	−551	.....	−2,802	−551	.....
Nonfederal sources	−31	−5,574	.....	−31	−5,574	.....
Recovery of prior-year obligations, obl. plan	.....	.....	.....	−16,595	.....	.....
Unobligated balance available, start of year for completion of prior-year budget plans	.....	.....	.....	−252,289	−337,015	−115,925
Available to finance new budget plans	−45,700	−9,000	.....	−45,700	−9,000	.....
Reprograming from (−) or to prior-year budget plans	−73,125	−113,038	.....	.....	.....	.....
Unobligated balance transferred from other accounts	.....	−25,000	.....	.....	−25,000	.....
Unobligated balance transferred to other accounts	.....	122,038	.....	.....	122,038	.....
Unobligated balance available, end of year:						
For completion of prior-year budget plans	.....	.....	.....	337,015	115,925	53,025
Available to finance subsequent year budget plans	9,000	.....	.....	9,000	.....	.....
Budget authority	139,600	103,100	191,100	139,600	103,100	191,100
Budget authority:						
Appropriation	175,900	103,100	191,100	175,900	103,100	191,100
Transferred to other accounts	−36,300	.....	.....	−36,300	.....	.....
Appropriation (adjusted)	139,600	103,100	191,100	139,600	103,100	191,100

[1] Includes $900,000 in 1973 for other weapons requiring congressional authorization.

Chairman ELLENDER. You may proceed.

APPROPRIATION COMPONENTS

General ARMSTRONG. The fiscal year 1973 budget will provide funds for ammunition, weapons, tracked combat vehicles, guided missiles, communication/electronics equipment, support vehicles, and engineering and general supply equipment. These items will be used by both our regular and reserve operating forces. Additionally, the budget will provide funds for the ground-based communication and electronics equipment utilized by our Fleet Marine Force aviation units, for base support equipment, and for commercial vehicles required by our bases and air stations.

The total fiscal year 1973 program is represented by a request for $191.1 million in new obligational authority.

WEAPONS AND COMBAT VEHICLES AUTHORIZATION

Chairman ELLENDER. Does the $63.1 million requested for this budget activity all require 412 authorization?

General ARMSTRONG. Yes, sir; the entire amount requires 412 authorization.

The fiscal year 1973 procurement, Marine Corps budget, excepting those items in phased procurement, provides for attainment of our materiel objectives.

The six significant highlights of this request are:

NEW ASSAULT AMPHIBIAN VEHICLE: LVT–7

First—$61.2 million to finance the fourth and final increment of our multiyear procurement of the new assault amphibian vehicle family—the LVT–7.

Chairman ELLENDER. Are these vehicles now in production?

General ARMSTRONG. Yes, sir. They are under contract. In fact, they were contracted in 1970. We took delivery of the first production vehicles in August of this past year.

Chairman ELLENDER. Does this amount of $61.2 million represent the full cost of the vehicles?

General ARMSTRONG. This is the final increment; yes, sir.

DECISION NOT TO CONTRACT FOR VEHICLE MINE CLEARANCE VERSION

This is a good time to insert that it is highly probable at this point that we will not use all of this money that we have identified. We will not go to contract with the mine clearance version of this vehicle which is known as LVTE–7. This came about as a result of a very late decision made by the Commandant of the Marine Corps.

Chairman ELLENDER. How much do you propose to use of the $61.2 million?

General ARMSTRONG. It will be a minus $7.7 million for the 1973 program.

Admiral MOORE. Mr. Chairman, the requirement with that program excluded would be $53.5 million. Is that the answer to the question you asked?

Chairman ELLENDER. Yes. It was how much of the $61.2 million——

Admiral MOORE. $7.7 million he addresses as a program which will probably not go to contract.

Senator PASTORE. What happens if you make a reduction of the $7.7 million?

Chairman ELLENDER. That is what I propose to do.

Senator PASTORE. Do we get ourselves in a hassle here? You are not asking for $61.2 million actually. What are you asking for? Are you asking for the reduced figure of $53.5 million?

General ARMSTRONG. Yes, sir.

Senator PASTORE. That is all I want to know. You said you may not use it. We are not going to give it to you, if you are not going to use it. So this request is for what?

General ARMSTRONG. It would be minus $7.7 million.

Chairman ELLENDER. That would be around $54 million. We shall make the reduction.

Senator PASTORE. How much have we spent on this contract?

General ARMSTRONG. On the procurement, none.

Senator PASTORE. This $54 million is the full cost?

General ARMSTRONG. That is correct, sir.

Chairman ELLENDER. Has the order been cut back?

General ARMSTRONG. On the LVTE7, which is the mine clearance version, there have been none produced. We would have had to make a contract decision in the very near future. We have just decided that we will not contract for the vehicle. That will be a total program reduction of 63 vehicles.

TOTAL PROGRAM

Senator YOUNG. How many new vehicles are involved in this $54 million?

Admiral MOORE. Of the LVTP7, there will be 241 bought at a price of $33.6 million. The LVTC7, 40 of them for $6.6 million. The LVTR7, 28 of them for $4.8 million.

Senator YOUNG. What will that equip?

Admiral MOORE. That is the annual increment for the new LVT7 program which replaces an earlier configuration of amphibious vehicle.

Senator YOUNG. Will that be sufficient procurement for more than one division or not enough for one division?

General ARMSTRONG. This will be more than enough for a division and will complete the war reserve. This is the end of the program which is a 4-year program. It was a total of 1,133 of these vehicles over the four-year period and we are subtracting out 63.

LANDING FORCE ASSAULT AMPHIBIAN VEHICLES

Chairman ELLENDER. Give us a general description of this vehicle, and explain the different missions of the four different versions of this vehicle; the personnel carrier, the command and communications vehicle, the amphibian recovery vehicle and the mine clearance vehicle; which we discussed earlier.

General ARMSTRONG. The LVTP7, basic vehicle of the family, is an amphibian armored personnel carrier with water borne capabilities which enable operation in the open sea, surf zone and fast flowing rivers. It is constructed of integral aluminum armor, is smaller than

the in-use LVTP5A1, is track propelled on land and hydrojet propelled in water. The vehicle mounts a .50 caliber machine gun and is capable of transporting 25 combat equipped troops or 10,000 pounds of cargo.

The LVTP7 is utilized to land and transport personnel and cargo during amphibious assault operations and subsequent operations ashore. The LVTC7 is fitted with special communications equipment to provide the commander with a means of directing the landing forces during the aforementioned operations. The LVTR7 is utilized for the recovery of other amphibians and for the performance of organizational and field maintenance during operations. The LVTE7, which as previously discussed is not to be procured, was designed to employ rocket projected demolition linear charges to breach mined areas and reduce obstacles for the passage of personnel and vehicles in amphibious landings and subsequent operations ashore.

Chairman ELLENDER. As I just indicated, the missile data sheet indicates a request of $54.9 million for the procurement of 342 of these vehicles. However, I call your attention to lines 21 through 24 of the P–1 exhibit where I note requests for 354 of these vehicles at a cost of $52.3 million. Would you please clear up this discrepancy.

General ARMSTRONG. The Weapons and Vehicle Data Sheet includes only the U.S. Marine Corps program; thus, the fiscal year 1973 THAI vehicles [deleted] are not reflected. Further, the data sheet "Vehicle Procurement Cost" entry includes $4.4 million for LVT design contractor services; this item appears on the P–1 as a separate line (No. 25).

Chairman ELLENDER. I note your requirement for this vehicle in all configurations is stated at 1,133, and 791 have been funded through fiscal year 1972. Is it correct to assume that your request for fiscal year 1973 will conclude the procurement request for these vehicles?

General ARMSTRONG. Yes sir, that is correct.

Senator YOUNG. With respect to your total requirement of 1,133, how does this break down between the different versions of this vehicle?

General ARMSTRONG. Sir, the breakdown is as follows:

LVTP7	939
LVTC7	77
LVTR7	54
LVTE7	63
Total	1,133

ASSAULT AMPHIBIAN MINE CLEARANCE VEHICLE

Chairman ELLENDER. As we discussed earlier, your request includes $7.3 million for the procurement of 45 of the mine clearance versions of this vehicle, and you indicated that a decision had been made not to procure these vehicles. Let me be sure that I understand the effect of this decision on your fiscal year 1973 request. There will be no requirement for the $7.3 million for the procurement of the 45 vehicles set out on line 24 of the P–1 exhibit, the $4.4 million requested in line 25 for design contract services can be reduced by $100,000 to

$4.3 million, and the $1.2 million requested in line 27 for spares and repair parts can be reduced to $900,000, a reduction of $300,000. This gives a total reduction of $7.7 million in the 1973 request. Are my figures correct?

General ARMSTRONG. Yes sir, they are correct.

Senator YOUNG. I note that the fiscal year 1972 program included $3 million for the procurement of 18 of these mine clearance vehicles. What is the status of this program?

General ARMSTRONG. The planned procurement of these vehicles has been canceled, as we have discussed, and the $3 million of fiscal year 1972 funds has been reprogramed within the Marine Corps.

Chairman ELLENDER. Earlier, in your discussions of this vehicle, you referred to 63. Does that 63 include the 18 in the fiscal year 1972 program and the 45 included in the fiscal year 1973 request?

General ARMSTRONG. Yes, sir.

Senator YOUNG. On line 25 of the P–1 exhibit, I note a request for $4.4 million for LVT design contract services. Please explain this item.

General ARMSTRONG. The LVT design contract services entry refers to the "vehicle design contractor" contract which is awarded on an annual basis to FMC Corporation, San Jose, California, and is administered through the Naval Ship Systems Command. This contract provides for revisions to and maintenance of all basic and original configuration data not otherwise required as deliverable items under the production contract. This service includes: technical engineering, administration and logistic support of LVTP7 production requirements; engineering services required to assure that the configuration of the hardware properly represents the drawings and documentation; integrated logistic support services; and maintenance of the master production vehicles.

M–109 155-MILLIMETER HOWITZER MODIFICATION KITS

Chairman ELLENDER. The request includes $700,000 for the modification of the M–109 155-millimeter howitzers. Please comment on the improvements you will gain through these modifications.

General ARMSTRONG. Application of this modification kit to the M–109 howitzer will permit the weapon to achieve a range of 18,000 meters firing the M–107 projectile, or 24,500 meters firing the M–549 RAP round. Additionally, this modification will provide significant improvements in performance of the elevation system, traverse system, and bore evacuator system.

Chairman ELLENDER. It is my understanding that your plan calls for the modification of 116 of these guns. Am I correct about this?

General ARMSTRONG. Yes, sir.

Chairman ELLENDER. When do you expect to complete this modification program?

General ARMSTRONG. This is the second year of a 3-year phased procurement. Current plans call for this modification to be completed on all weapons during fiscal year 1975.

Senator YOUNG. Forty-one of these modifications were funded in the fiscal year 1972 appropriation act. When do you expect these modified guns to be operational?

General ARMSTRONG. The weapons will be operational by the end of third quarter, fiscal year 1973.

MISCELLANEOUS ITEMS

Chairman ELLENDER. On line 26 of the P–1 exhibit, there is a request of $1.2 million for first destination transportation. Are these funds for the transportation of tracked combat vehicles only?

General ARMSTRONG. Yes, sir; they are.

Chairman ELLENDER. With respect to the request of $1.2 million for the procurement of spares and repair parts, how much of that represents initial spares for the amphibious assault vehicles?

General ARMSTRONG. $500,000 of the $1.2 million is for initial spares for the amphibious assault vehicles.

Senator YOUNG. Give us several examples of the types of items you expect to procure with the $2.4 million requested for "Items less than $500,000."

General ARMSTRONG. We expect to procure collateral equipment for $2,308,360 and interim support equipment for $52,744.

WEAPONS

Chairman ELLENDER. The request for this activity includes $900,000 associated with weapons, of which $200,000 is for first destination transportation and $700,000 is for "Items less than $500,000." Give us several examples of the types of items you expect to procure with these funds.

General ARMSTRONG. Yes, sir; we will procure:

Collateral equipment: $6,000.
Rifle team equipment and weapons: $192,160.
Special training devices: $470,000.

AMMUNITION

Chairman ELLENDER. You may proceed.

General ARMSTRONG. Second—$16.6 million for ammunition to provide for training consumption and to attain approved levels of mobilization reserve stocks.

Chairman ELLENDER. How much of this total do you estimate is necessary to replace training consumption during fiscal year 1973?

General ARMSTRONG. The total amount necessarily to replace training consumption during fiscal year 1973 is estimated at $12 million.

SEA CONSUMPTION NOT INCLUDED

Senator YOUNG. It is correct to assume that your fiscal year 1973 request does not include any funds based on the consumption of ammunition in Southeast Asia?

General ARMSTRONG. Yes sir; the fiscal year 1973 request does not include any funds based on the consumption of ammunition in Southeast Asia.

NEW AMMUNITION PROCUREMENT

Chairman ELLENDER. Does the $16.6 million requested for ammunition include funds for the procurement of any ammunition item that has not been procured in previous fiscal years, and if so, please comment on these new items.

General ARMSTRONG. Yes, sir. The following items have not been procured in previous fiscal years.

(1) Projectile, 155-millimeter HE (RAP) M549:

This projectile will achieve a range of 19,600 meters with the standard propelling charge M4 and 24,500 meters with the M119 propelling charge. The current maximum range of the 155-millimeter HE projectile M170 is 14,600 meters. Fiscal year 1973 buy of 13,340 projectiles at a cost of $2.5 million will achieve approximately 55 percent of the inventory objective.

(2) Charge, propelling, 155-millimeter M119E5:

This charge will extend the range of the standard 155-millimeter HE (M107) projectile to 19,600 meters, vice 14,600 meters with the current charge, and the 155-millimeter HE (RAP) to 24,500 meters, vice 19,600 meters with the current charge.

Chairman ELLENDER. On line 19 of the P–1 exhibit, I notice a request of $0.2 million for "Items less than $500,000." Give us several examples of the types of items you expect to procure with these funds.

General ARMSTRONG. Yes, sir. Examples of what we expect to procure are:

Cartridge, 12 gage, No. 7: $18,294.
Cartridge, 12 gage, No. 9: $68,749.
Cartridge, 90-millimeter blank: $72,333.

AMMUNITION PROCUREMENT COORDINATION

Chairman ELLENDER. How is your procurement of ammunition coordinated with the Army's procurement of the same ammunition items?

General ARMSTRONG. The Marine Corps has a customer relationship with the Army in the procurement of ground ammunition. Prior to including an item of ammunition in the budge request, the Army is interrogated regarding unit cost and item availability.

GUIDED MISSILE PROGRAM: IMPROVED HAWK SYSTEM

Third—$22.1 million for the Marine Corps guided missile program. Of this amount, $20.6 million is requested for the improved Hawk system. This is the second increment of a 5-year program. The improved Hawk system is an important element of the Marine Corps air defense capability required to counter the anticipated air threat of the mid-1970's.

OTHER COSTS

The remaining $1.5 million is for first destination transportation charges, spares and repair parts and various items less than $500,000.

SURFACE-TO-AIR MISSILE

Chairman ELLENDER. Is the Hawk missile system included in your request the same as the Army's?

General ARMSTRONG. Yes, sir.

IMPROVED HAWK SYSTEM

Chairman ELLENDER. As I understand the missile data sheet, of the $20.6 million requested, $15 million is for the procurement of missiles, and $5.6 million is for the procurement of ground equipment. Am I correct about this?

General ARMSTRONG. The $15 million is for procurement of missiles, but the $5.6 million is for the modification of basic Hawk assets to the improved Hawk configuration.

Chairman ELLENDER. It is indicated that the funds requested for fiscal year 1973, along with the funds provided in fiscal year 1971 for the procurement of ground equipment, will provide for the activation of two battalions of three batteries each with the improved Hawk system. Under your current plan, how many battalions and how many batteries of the improved Hawk do you plan to have?

General ARMSTRONG. The Marine Corps plans to have three battalions equipped with the improved Hawk—two regular Marine Corps; one in the Marine Corps Reserve—for a total of nine active batteries. An additional five battery sets of equipment will be procured to establish an operational readiness float allowance and provide sufficient assets for maintaining the pipeline of a depot maintenance rebuild facility.

Senator YOUNG. How is your procurement of the improved Hawk system coordinated with the Army's procurement of this system?

General ARMSTRONG. Marine Corps requirements are included in the Army's master plan for procurement of all improved Hawk assets. This provides for the most cost effective solution to the total program buy.

MISCELLANEOUS ITEMS

Chairman ELLENDER. $700,000 is requested for first destination transportation. Are these funds for the transportation of items procured under this budget activity only?

General ARMSTRONG. Yes, they are.

Chairman ELLENDER. $600,000 is requested for spares and repair parts. How much of this is required for initial spares to support the improved Hawk system?

General ARMSTRONG. $300,000 of the $600,000 is for initial spares for the improved Hawk system.

Senator YOUNG. Give us two or three examples of the types of equipment you expect to procure with the $200,000 requested for "Items less than $500,000."

General ARMSTRONG. We will procure:
HQMC items: $128,250.
Modification kits: $20,000.
Interim support equipment: $12,600.

COMMUNICATION AND ELECTRONICS EQUIPMENT

Fourth—$57.7 million to fund the following new and continuing programs for communication and electronics equipment: $10 million for the Marine Corps high frequency radio program which is represented by the procurement of the AN/MRC HF radio set. The AN/MRC is a vehicular mounted radio receiver/transmitter which provides medium range point-to-point communications at battalion level and higher. This radio replaces the AN/TRC–75, which has been in service for 10 years.

Chairman ELLENDER. On line 38 of the P–1 exhibit, I notice the request of $10 million for the procurement of 711 AN/MRC HF radio sets. Is this the item you referred to in your statement?

General ARMSTRONG. Yes, sir.

Chairman ELLENDER. You indicate that these radios are being procured to replace the AN/TRC–75, which has been in service for 10 years. Comment on the improved capabilities of this new radio over the one you are replacing.

General ARMSTRONG. The new radio system requires less power thus allowing the Marine Corps to utilize the existing vehicle in its standard configuration. The design features improved reliability, lower weight, smaller size, additional tuning capability, and simplified operator functions. The overall concept allows utilization of major components of the radio set to satisfy requirement for high frequency manpack and teampack equipments as well.

Senator YOUNG. I note the estimated cost of this new radio is $14,000 for fiscal year 1973. How does this compare with your fiscal year 1972 cost for this radio?

General ARMSTRONG. The fiscal year 1972 unit price was $5,000 higher to cover the cost of the component vehicle. The cost of the component radio is the same in each year. Existing vehicle assets will allow retrofit of the fiscal year 1973 buy of the component radio.

Senator YOUNG. It is my understanding that 711 of these radios you are requesting in fiscal year 1973 will complete your inventory objective for this particular radio. Am I correct about this?

General ARMSTRONG. Yes, sir.

Chairman ELLENDER. On line 46 of the P–1 exhibit, I note a request of $900,000 for the procurement of 225 facsimile sets. Please describe this piece of equipment.

General ARMSTRONG. The facsimile set AN/GXC–7 is a militarized commercial equipment that is capable of electrically transmitting and receiving written, typed, or graphic information. Rapid electrical transmission of overlays and captured enemy documents from lower to higher headquarters are examples of the uses of the tactical facsimile set.

Chairman ELLENDER. Is this the initial procurement of this item?

General ARMSTRONG. Yes, sir.

Chairman ELLENDER. On line 48 of the P–1 exhibit I note a request of $3.2 million for the procurement of spares and repair parts. Are these for the support of your total inventory of telecommunications equipment?

General ARMSTRONG. Yes, sir.

Senator YOUNG. Give us several examples of the types of items you expect to procure with the $4.3 million you are requesting for "Items less than $500,000."

General ARMSTRONG. Our procurement will include:

Radio set AN/MRC–134: $200,982.
Power measuring set AN/USM: $91,025.
Frequency meter AN/USM–159: $142,500.
Generator signal AN/URM–165: $135,000.

A total of $29.6 million is for radars, of which $26.4 million is requested for the procurement of the radar, course directing, central, AN/TPQ–27. The AN/TPQ–27 will replace our aging AN/TPQ–10 equipment and will provide significantly increased capabilities to the Marine Corps air support radar teams in controlling aircraft in the direct air support mission. The remaining $3.2 million is for solid state radar beacons for use by forward air controllers to give properly equipped aircraft a more responsive and accurate all weather close air support capability. Additionally, $18.1 million is requested for all other communication/electronics equipment, test and repair equipment, and the spare parts necessary to support our investment in these areas.

RADARS AND EQUIPMENT

Chairman ELLENDER. On line 55 of the P–1 exhibit, there is a request of $26.4 million for the procurement of 16 radar sets designated "AN/TPQ–27." Is this the item you referred to in your statement?

General ARMSTRONG. Yes, sir.

Chairman ELLENDER. Is this the initial procurement of this radar system?

General ARMSTRONG. Yes, sir.

Senator YOUNG. Please describe the purpose of this radar.

General ARMSTRONG. The primary purpose of the system is precise all-weather control of close support attack aircraft. The coordinates of a ground target are reported to the system computer. The system's radar measures the position of the attack aircraft. The system then steers the aircraft to the bomb-release point, and sends the release signal. Variations on the primary mission include control of parachute drops, helicopters, or photographic aircraft.

Chairman ELLENDER. I note that it is to replace an earlier system designated "AN/TPQ–10." Just what improvements will you gain through the replacement of this old radar system?

General ARMSTRONG. The AN/TPQ–27 will be more accurate, have greater reliability, and will be able to exercise course control over several aircraft at once.

Chairman ELLENDER. I note that this is a very expensive system, about $1.6 million per set. What is your total requirement for this radar system?

General ARMSTRONG. The total requirement, including the Reserve forces allowance, combat spares, and maintenance floats, is for 20 systems.

Senator YOUNG. This set is identified "code B." When do you expect it to be identified "code A"?

General ARMSTRONG. December 1972.

Chairman ELLENDER. On line 57 of the P–1 exhibit, there is a request of $3.2 million for the procurement of 315 transponder sets. I think you referred to this item in your statement, did you not?

General ARMSTRONG. Yes, sir.

Chairman ELLENDER. Is this the initial procurement of this piece of equipment?

General ARMSTRONG. Yes, sir.

Chairman ELLENDER. As I recall, this equipment is used by your forward air controllers in connection with the close air support mission. Am I correct about this?

General ARMSTRONG. Yes, sir.

Chairman ELLENDER. When do you expect this piece of equipment to be identified "code A"?

General ARMSTRONG. November 1972.

OTHER SUPPORT

Chairman ELLENDER. On line 59 of the P–1 exhibit, there is a request of $1.7 million for test calibration maintenance support. I note that only $500,000 was required for this program for fiscal years 1971 and 1972. Give us a brief description of this program, and comment on the need for the increase of $1.2 million.

General ARMSTRONG. This program provides for the procurement of test, calibration, and other maintenance support equipment which is required to expedite fault detection and location, and component replacement and repair; and insure that acceptable performance levels are maintained on major end items. The planned fiscal year 1973 procurement of radar sets, AN/TPQ–27 has resulted in the requested $1.2 million increase which is less than 5 percent of the acquisition cost of the AN/TPQ–27.

Senator YOUNG. On line 60 of the P–1 exhibit, there is a request of $1.8 million for spares and repair parts. How much of this is for initial spares, if any, and what systems are to be supported with these initial spares, if any?

General ARMSTRONG. $1.2 million of the $1.8 million is for initial spares. Systems to be supported with these initial spares are the Marine Air-Ground Intelligence System (MAGIS) and the radar course Directing Central, AN/TPQ–27.

SUPPORT VEHICLE PROGRAM

Fifth—$12.8 million for the Marine Corps support vehicle program. Of this amount $4.6 million is for replacement of commercial cargo and passenger vehicles. The request does not include any funds for the purchase of new vehicles above those needed for replacement.

However, in accordance with the wishes of the Congress, funds have been included under the operation and maintenance appropriation for the leasing of vehicles in support of the Marine Corps recruiting program. Of the $12.8 million, $8.2 million will be utilized for the combat support vehicle program. This $8.2 million includes $1.3 million for the procurement of the M151A2 jeep, while the remaining $6.9 million will fund for first destination transportation charges, spares, and repair parts, and various items less than $500,000.

COMMERCIAL VEHICLES

Chairman ELLENDER. As you indicated in your statement, the request for support vehicles includes $700,000 for the procurement of commercial passenger vehicles and $3.9 million for the procurement of commercial cargo vehicles. As I recall, you indicated that all of these vehicles are for the replacement of existing vehicles. Am I correct about this?

General ARMSTRONG. Yes, sir. You are correct.

Chairman ELLENDER. Please provide a tabulation for the record listing the types, the number, and the amount for the various types of passenger and cargo vehicles requested.

General ARMSTRONG. Yes, sir.

(The information follows:)

PASSENGER VEHICLES

Types	Quantity	Amount
Sedans, light	150	$360,000
Station wagons	37	100,000
Buses, motor	27	277,000
Total	214	737,000

COMMERCIAL CARGO VEHICLES

There are 42 individual vehicle types which make up this request. In broad categories they are:

Type	Quantity	Amount
Light trucks (¼ to ¾ tons)	376	$1,168,100
Medium trucks (1 to 2 tons)	88	286,900
Heavy trucks (3 to 5 tons)	255	1,941,700
Trailers	49	460,000
Motor scooters	30	36,000
Total	798	3,892,700

The vehicle designs range from light pickup trucks, carryalls, compact vans and maintenance trucks to medium and heavy cargo vehicles, truck tractors and trailers.

ONE-FOURTH-TON UTILITY TRUCKS

Chairman ELLENDER. On line 65 of the P–1 exhibit, there is a request of $1.3 million for the procurement of 350 M151A1 ¼-ton utility trucks, commonly referred to as the Jeep. Are these for the replacement of existing trucks, or for an increase in your total inventory?

General ARMSTRONG. Sir, these vehicles will be utilized to replace existing trucks that have become unserviceable and are not reparable.

Senator YOUNG. Is this the same type of jeep procured by the Army, and if so, how is your procurement coordinated with that of the Army?

General ARMSTRONG. Sir, these vehicles are the same type procured by the Army. The Marine Corps' funds will be transferred to the Army by military interdepartmental purchase request and the requirements incorporated into the contract administered by the Army.

SPARE AND REPAIR PARTS

Chairman ELLENDER. On line 68 of the P–1 exhibit, I note a request of $5.4 million for the procurement of spares and repair parts. Only $2.3 million was provided for this purpose in fiscal year 1971, and $2.4 million in fiscal year 1972. Just what is the need for this very large increase?

General ARMSTRONG. Sir, the increase is needed for the procurement of PWR (Prepositioned War Reserve) deficiencies; $2.8 million of the total request is for this purpose. A shortage of spares and repair parts in this area was recognized when the fiscal year 1971 and 1972 budgets were submitted; however, funds were not requested at that time because the full potential for buildup of PWR assets through rollback of items associated with our withdrawal from RVN was not known. All rollback assets have now been applied to requirements with the result that a residual deficiency of $2.8 million still exists. This represents a firm requirement which we now feel must be funded to provide essential support for major end-items in the inventory.

MISCELLANEOUS ITEMS

Senator YOUNG. Give us several examples of the types of items you expect to procure with the $1.3 million requested on line 69 for "Items Less Than $500,000."

General ARMSTRONG. Yes, sir. We will procure:

Special training devices: $300,000.
Collateral equipment: $12,700.
Shop set, auto basic: $393,200.
Interim support equipment: $36,800.

EQUIPMENT UTILIZATION

Chairman ELLENDER. Is all of this equipment to be used at the bases you operate?

General ARMSTRONG. No, sir. Two significant examples of major items which will be used by the Fleet Marine Forces are: The AN/MRC HF radio and the AN/TPQ–27 radar. The jeep mounted radio, the MRC HF, is a tactical radio for use within the divisions, battalions, and force headquarters in the Fleet Marine Force. Likewise the radar, the AN/TPQ–27, is integral to the air support of the Marine Corps air/ground team.

Chairman ELLENDER. You use this for training?

General ARMSTRONG. Yes, sir; but its primary purpose is in the Fleet Marine Force.

UTILIZATION OF EXISTING EQUIPMENT

Chairman ELLENDER. You say you replace existing equipment?
General ARMSTRONG. Yes, sir.
Chairman ELLENDER. What do you do with the excess?
General ARMSTRONG. It is worn out.
Chairman ELLENDER. Do you dispose of it?
General ARMSTRONG. Yes, sir. Most of it will be disposed of. Some of it will in fact be used by the Reserves for a while and then we will phase it all out.
Chairman ELLENDER. How do you dispose of the surplus? Do you report it to GSA?
General ARMSTRONG. Through the property disposal system; yes, sir.
Senator PASTORE. It probably is junk when you get through with it.
General ARMSTRONG. Yes, sir.

HAWK MISSILE LOCATION AND CAPABILITY

Senator PASTORE. Will you refer back to the Hawk missile system? I understand this missile has a conventional warhead, not an atomic warhead.
General ARMSTRONG. That is correct.
Senator PASTORE. What is its mission? You spoke of an anticipated air threat. Where is this based?
General ARMSTRONG. These are oversea deployments.
Senator PASTORE. What is the range of this missile? Could it fly higher than a plane?
General ARMSTRONG. Yes, sir.
Senator PASTORE. How far up?
General ARMSTRONG. It will go up [deleted] feet. It will engage targets to about [deleted] miles an hour.
It is a considerable improvement over the basic Hawk. This is an Army development. We are tailing on their program, of course. They are advertising a kill capability of, I believe [deleted] on a single target, and [deleted] if it has to make up its mind which of two targets to take, multiple targets, which is really a discrimination problem.
Senator PASTORE. What does [deleted] or [deleted] mean? How many times would it hit?
General ARMSTRONG. Out of a thousand targets; you ought to hit [deleted.]
Senator PASTORE. That is pretty good.
Chairman ELLENDER. It is a defense against airplanes?
General ARMSTRONG. Yes, sir.
Senator PASTORE. Missile?
General ARMSTRONG. Well, it is primarily for airplanes. I would say it might or might not be effective against some missiles.
Chairman ELLENDER. Do you anticipate this would be used in western Europe?
General ARMSTRONG. Wherever we deploy a Marine amphibious force; sir. We had two of these battalions of the earlier Hawk in Vietnam for a while. Of course, they have all been redeployed now.
Chairman ELLENDER. Proceed.

ENGINEER, GENERAL SUPPLY AND AUTOMATIC DATA PROCESSING EQUIPMENT

General ARMSTRONG. Our sixth item, $18.8 million for the engineer, general supply, and automatic data processing equipment necessary for new and continuing programs. This $18.8 million includes $3 million for the purchase of cranes and tractors, $4.6 million for the self-contained, transportable medical unit program, $1 million for automatic data processing equipment, $7 million for items less than $500,000, and $3.2 million for first destination transportation charges, spares and repair parts, and other miscellaneous engineer and general supply items.

SELF-PROPELLED 3-TON CRANES

Chairman ELLENDER. On line 72 of the P–1 exhibit, I notice a request of $1.9 million for the procurement of 59 3-ton self-propelled cranes. Please describe this piece of equipment and comment on your need for the 59 you are requesting.

General ARMSTRONG. Sir, the self-propelled 3-ton crane is a hydraulically operated four-wheel drive and four-wheel steer crane. It is designed to operate in rough terrain and has a three-ton lifting capacity. The 59 cranes requested are to achieve the Marine Corps inventory objective for this item.

TRACTORS

Chairman ELLENDER. On line 75 of the P–1 exhibit, there is a request for $200,000 for the procurement of 16 tractors. Please describe this piece of equipment, and comment on your need for the 16 you are requesting.

General ARMSTRONG. Sir, these are full-tracked tractors with a bulldozer blade that are capable of being helicopter transported. The 16 tractors are required to obtain the Marine Corps inventory objective for this tractor.

Chairman ELLENDER. On line 76 of the P–1 exhibit there is a request of $400,000 for the procurement of 25 tractors. Please describe this piece of equipment, and comment on the need for the 25 you are requesting.

General ARMSTRONG. Sir, these tractors are rubber tired, helicopter-transportable tractors which are equipped with a front-end loader, backhoe and earth auger. The quantity of 25 requested is to achieve the Marine Corps inventory objective for this tractor.

Chairman ELLENDER. On line 77 of the P–1 exhibit, there is a request of $500,000 for the procurement of 20 articulated tractors. Please describe this piece of equipment and comment on your need for the 20 you are requesting.

General ARMSTRONG. Sir, these tractors are rubber-tired, four-wheel drive, rough terrain tractors. The tractors can be utilized as a forklift or as a scooploader. With a forklift attachment, the tractor is capable of lifting 10,000 pounds and with a bucket, the tractor can move 2¼ cubic yards of material at one time. The 20 tractors are required to achieve the Marine Corps inventory objective for this item.

MISCELLANEOUS EQUIPMENT

Chairman ELLENDER. On line 80 of the P–1 exhibit, there is a request of $200,000 for modular relocatable buildings. Please describe this piece of equipment and comment on your need for those that you want to procure in fiscal year 1973.

General ARMSTRONG. Sir, this request is for the procurement of relocatable maintenance shelters to replace existing tentage that has shown to be inadequate to support our maintenance activities in the field. The erected shelters will provide a completely enclosed 32-foot by 70-foot area with a minimum height clearance of 14 feet at the eaves.

Senator YOUNG. Please comment on the request of $200,000 for helicopter refueling systems set out on line 81 of the P–1 exhibit.

General ARMSTRONG. Sir, this request provides for replenishment quantities of the helicopter refueling systems. These items are used for expedient refueling of helicopters in forward areas.

Chairman ELLENDER. Please comment on the $700,000 requested for combat photographic systems, set out on line 83 of the P–1 exhibit.

General ARMSTRONG. Sir, this request is to allow completion of the procurement of photographic processing and photographic reproduction facilities for use by Marine Corps divisions.

Senator YOUNG. Just what is involved in the request of $700,000 for printer viewer imagery set out on line 84 of the P–1 exhibit?

General ARMSTRONG. Sir, this is a portable dry-process printer and a negative viewer set used in conjunction with a 35-millimeter camera and hand-held film processor to provide the tactical unit commander with near-real-time photographic intelligence.

Chairman ELLENDER. Comment on the $500,000 requested for automatic materials handling equipment set out in line 85 of the P–1 exhibit.

General ARMSTRONG. Yes, sir. I will be glad to. These funds are required to provide those improvements essential to our continuing warehouse modernization program. We will use these funds to procure such items as conveyors, overhead monorails, automatic diverters and sorters, and so forth. These improvements will enhance our capability to provide rapid supply response at decreased man-hour cost with resultant acceleration of the flow of supplies to the ultimate consignee. These improvements will also provide for more effective utilization of current storage facilities which is in consonance with the total Department of Defense supply concept.

MUST HOSPITALS

Senator YOUNG. You referred to the $4.6 million requested for the self-contained transportable medical units or MUST hospitals. Why is this item being procured by the Marine Corps rather than by the Navy, inasmuch as the Marine Corps is dependent upon the Navy for medical support?

General ARMSTRONG. MUST is being funded by the Marine Corps in accordance with Department of the Navy policy (SECNAV INST 7042.6C) which alines financial responsibility with command respon-

sibility, both in the shore establishment and the operating forces. The Bureau of Medicine and Surgery continues to exercise technical control of all medical technical equipment and in the exercise of this control "approve for use" the procurement of such items.

Senator YOUNG. Would you please provide a statement for the record describing this system, the various components included in the system, and indicate how many systems will be procured with the $4.6 million you are requesting?

General ARMSTRONG. Medical Unit, Self-contained, Transportable (MUST) was developed for U.S. Army Medical Department as an up-to-date field medical unit which included mobility, short set-up time, high reliability and efficiency, with the capability of all-weather operation, and a controlled environment, free from contaminants, to more nearly meet modern hospital standards and capabilities. The MUST consists of a series of functional elements separately identified as power unit (the electrical, water, heat, and refrigeration system), surgical, sterile preparation, oral surgery, clinical laboratory, X-ray, pharmacy, ward, emergency treatment, patient receiving and dispensary, ear, nose, and throat, orthopedic, eye, and supply. Medical equipment is either housed in expandable shelters or included in a ward container together with an inflatable shelter.

The power unit (utility pack) of the MUST provides its own supply of electrical power, heated and cooled air ventilation, hot and cold water, and compressed air. The family of equipment is completely self-sufficient except for a supply of potable water and power unit fuel. Construction of the shelter and ward containers is of lightweight materials such as aluminum, fiberglass and inflatable, rubberized fabric.

The MUST system is of modular design and can be transported by air, rail, sea, or on a dolly set (transporter). All units have skids for towing short distances. Shelter loading kits are provided for loading and unloading certain modules on and off trucks.

The MUST system is intended to maximize patient care capability when utilized in combat or other medical disaster conditions under a wide range of environmental conditions by providing a controlled environment of clean air with regulated temperature and humidity. It also can be transported and set up anywhere in the world with maximum utilization of medical personnel and equipment to insure the best possible patient care.

The $4.6 million requested will procure two complete 60 bed—two surgery MUST hospitals plus additional quantities of long leadtime MUST components for the programed phase in of a complete MUST system to support two Marine Amphibious Forces.

AUTOMATIC DATA PROCESSING EQUIPMENT

Chairman ELLENDER. On line 88 of the P–1 exhibit, there is a request of $1 million for automatic data processing equipment. Exactly what do you plan to procure with these funds?

General ARMSTRONG. The $1 million to which you refer will purchase about a third of a new computer system to be installed on Okinawa. The remainder of this system is scheduled for purchase in fiscal year 1974.

Chairman ELLENDER. Earlier, we discussed the request of $7 million for the procurement of "Items less than $500,000." I wish you would provide a rather complete list of the items you expect to procure with these funds.

General ARMSTRONG. Yes, sir. I will provide a list for the record.

(The information follows:)

Logistic support boat with outboard motor	$124,800
Interim support equipment	293,398
Base Support Equipment:	
Other buildings and ground maintenance	20,209
Office equipment	311,570
Medical/dental	83,228
General purpose equipment	226,799
Utility equipment	466,433
Laundry equipment	264,004
Class 4 equipment	267,942
MCON related equipment	283,385
Equipment installation projects	28,500
Garrison mobile equipment	847,930
Headquarters support equipment	100,000
Special organizational equipment	100,000
HQMC items	503,500
Embossing machine electric model 6441	18,975
Field medical equipment	190,000
Special training devices	455,000
Bucket multi-purpose 2¼ yard	31,900
Compressor 600 CFM trailer mounted	48,132
Scraper towed 8 cubic yard	240,000
Ripper attachment 3 shank hydraulic	36,600
Cable splice machine	2,400
Special training devices	245,000
Modular relocatable building general purpose	153,000
Reproduction equipment whiteprinter	10,500
Cameron system photo ID	19,000
RVN engineer equipment	16,217
Collateral equipment	30,000
Decontamination apparatus power driven M12A1	439,140
Allowance changes	1,121,588
Interim support equipment	20,800

ITEMS LESS THAN $500,000

Chairman ELLENDER. The $7 million for items less than $500,000 includes what?

General ARMSTRONG. There are several hundred items in this category going all the way down—the biggest single item is in the base support area. This includes plant account equipment such as base laundry and dry cleaning equipment, office equipment, base medical and dental equipment.

Chairman ELLENDER. All of these are necessary for training?

General ARMSTRONG. Yes, sir; in the field and also for training. The major items I mentioned, which include tractors, are for tactical forces. The commercial type vehicles are for our post and stations and for training support. The various ancillary engineer equipment items, I mentioned, such as the scraper, multibuckets, cable splicers, plus numerous other items not mentioned are used in support and training for the Fleet Marine Forces and our post and stations.

Senator PASTORE. All these items are obtained by contract; are they not?

General ARMSTRONG. Yes, sir.

Senator PASTORE. In other words, this is not a contingency fund in that sense of the word?

General ARMSTRONG. No, sir.

Senator PASTORE. It is a catchall, because you can't readily itemize the various hundreds of items you might need. You have grouped them and they total $7 million. Any one of these items could cost less than $500,000?

General ARMSTRONG. That is correct, sir. It is a catchall, however, all items are itemized. The rollup is for convenience to preclude presenting a voluminous listing in the P–1 exhibit.

Chairman ELLENDER. Are there any further questions?

Thank you very much.

General ARMSTRONG. Thank you, sir.

Military Personnel, Navy

Reserve Personnel, Navy

STATEMENT OF VICE ADM. D. H. BAGLEY, U.S. NAVY, CHIEF OF NAVAL PERSONNEL

ACCOMPANIED BY:

VICE ADM. G. M. DAVIS, MEDICAL CORPS, U.S. NAVY, CHIEF, BUREAU OF MEDICINE AND SURGERY

REAR ADM. D. C. PLATE, U.S. NAVY, DEPUTY CHIEF OF NAVAL PERSONNEL

REAR ADM. S. H. MOORE, U.S. NAVY, DIRECTOR OF BUDGET AND REPORTS, OFFICE OF THE COMPTROLLER OF THE NAVY

REAR ADM. J. G. FINNERAN, U.S. NAVY, ASSISTANT CHIEF OF STAFF FOR PLANS AND PROGRAMS

REAR ADM. W. R. McCLENDON, U.S. NAVY, ASSISTANT DEPUTY CHIEF OF NAVAL OPERATIONS (AIR WARFARE)

REAR ADM. J. B. JOHNSON, U.S. NAVAL RESERVE, ASSISTANT DEPUTY CHIEF OF NAVAL OPERATIONS (NAVAL RESERVE)

CAPT. D. WIELAND, U.S. NAVY, ASSISTANT DIRECTOR, CHIEF OF NAVAL OPERATIONS, AVIATION TRAINING DIVISION

CAPT. H. H. NIEHAUS, U.S. NAVY, DIRECTOR, BUREAU OF NAVAL PERSONNEL, PLANS DIVISION

CAPT. R. ADRIAN, SC, U.S. NAVY, ASSISTANT CHIEF OF NAVAL PERSONNEL (FINANCE)

CAPT. A. S. DAVIS, SC, U.S. NAVY, COMMANDING OFFICER, NAVAL SUBSISTENCE OFFICE

CAPT. C. F. HICKEY, U.S. NAVY, HEAD, CHIEF OF NAVAL OPERATIONS, MANPOWER PROGRAMING AND BUDGET SUPPORT BRANCH

CAPT. A. L. KELLN, U.S. NAVY, HEAD, BUREAU OF NAVAL PERSONNEL, SUBMARINE/NUCLEAR POWER DISTRIBUTION CONTROL BRANCH

A. P. KENYON, SPECIAL ASSISTANT FOR EDUCATION AND TRAINING POLICY, CHIEF OF NAVAL OPERATIONS

H. F. NUTTMANN, HEAD, BUREAU OF NAVAL PERSONNEL, MILITARY PERSONNEL BUDGET DIVISION

W. A. JOHNSON, HEAD, BUREAU OF NAVAL PERSONNEL, OPERATIONS BUDGET DIVISION

F. D. ROBENHYMER, HEAD, MILITARY PERSONNEL BRANCH, OFFICE OF THE NAVY COMPTROLLER

CAPT. G. H. SEYMOUR, U.S. NAVY, OFFICE OF THE COMPTROLLER OF THE NAVY

MAJ. R. T. PACE, U.S. MARINE CORPS, OFFICE OF THE COMPTROLLER OF THE NAVY

D. C. SINCLAIR, OFFICE OF THE SECRETARY OF DEFENSE (COMPTROLLER)

BUDGET REQUESTS

Chairman Ellender. Vice Adm. David H. Bagley, Deputy Chief of Naval Operations for Manpower and Naval Reserve, will be the principal witness for two appropriations.

The first is "Military personnel, Navy," for which the fiscal year 1973 estimate is $5,352,749,000, which includes $274,949,000 for the January 1, 1972, pay raise.

The second request is that for "Reserve personnel, Navy," for which the fiscal year 1973 request is $230,640,000, which includes $12,440,000 for the January 1, 1972, pay raise.

PROGRAM AND FINANCING, "MILITARY PERSONNEL, NAVY"

At this point in the record there will appear certain program and financing information on "Military personnel, Navy" from the justifications.

(The information follows:)

DEPARTMENT OF DEFENSE—MILITARY, MILITARY PERSONNEL, NAVY PROGRAM AND FINANCING

[In thousands of dollars]

	Fiscal year—		
	1971 actual	1972 estimate	1973 estimate
Program by activities:			
Direct program:			
1. Strategic forces	134,466	150,872	155,344
2. General purpose forces	2,363,044	2,609,354	2,698,257
3. Intelligence and communications	321,611	235,258	237,382
4. Airlift and sealift	5,160	5,584	4,715
5. Guard and reserve	116,469	137,560	147,746
6. Research and development	64,031	70,478	70,949
7. Central supply and maintenance	105,257	119,006	120,073
8. Training, medical, and other general personal activities	1,556,261	1,604,240	1,768,524
9. Administration and associated activities	95,814	99,590	100,766
10. Support of other nations	39,206	50,669	48,993
Total direct program	4,711,319	5,082,611	5,352,749
Reimbursable (total)	32,875	36,000	36,000
Total obligations	4,744,194	5,118,611	5,388,749
Financing:			
Receipts and reimbursements from:			
Federal funds	−15,447	−19,699	−19,697
Trust funds	−105	−116	−118
Non-federal sources [1]	−17,323	−16,185	−16,185
Unobligated balance transferred from other accounts		−44,800	
Unobligated balance lapsing	228		
Budget authority	4,711,547	5,037,811	5,352,749
Budget authority:			
Appropriation	4,711,547	4,558,571	5,077,800
Proposed supplemental for Military Pay Act increases		341,329	
January 1972 pay increase supplemental /amendment		137,911	274,949
Relation of obligations to outlays:			
Obligations incurred, net	4,711,319	5,082,611	5,352,749
Obligated balance, start of year	81,345	47,899	79,510
Obligated balance, end of year	−47,899	−79,510	−105,259
Adjustments in expired accounts	14,970		
Outlays, excluding pay increase supplemental	4,759,734	4,573,671	5,325,089
Outlays from Military Pay Act supplemental		477,329	1,911

[1] Reimbursements are derived from sale of meals and clothing to service members (10 U.S.C. 7601).

The amounts shown as January 1972 pay increase supplemental/amendment are not distributed to each individual appropriation in the fiscal year 1973 president's budget, but are reflected as a 1-line defense-wide contingency amount. The amounts shown above are estimates, pending final determination of the amounts to be requested when supplemental and amended estimates are formally transmitted.

PROGRAM AND FINANCING, "RESERVE PERSONNEL, NAVY"

Chairman ELLENDER. Also at this point there will appear certain programing and financing information on "Reserve personnel, Navy."

(The information follows:)

DEPARTMENT OF DEFENSE—MILITARY RESERVE PERSONNEL, NAVY

PROGRAM AND FINANCING (IN THOUSANDS OF DOLLARS)

	1971 actual	1972 estimate	1973 estimate
Program by activities:			
Direct program:			
1. Reserve component personnel	146,932	191,130	216,617
2. Reserve officer candidates	9,051	12,694	14,023
Total, direct program	155,983	203,824	230,640
Reimbursable (total)	14	30	320
Total, obligations	155,997	203,854	230,960
Financing:			
Receipts and reimbursements from:			
Federal funds			−289
Non-Federal sources[1]	−14	−30	−31
Budget authority	155,983	203,824	230,640
Budget authority:			
Appropriation	155,983	182,791	218,200
Proposed supplemental for Military Pay Act increases		14,809	
January 1972 pay increase supplemental/amendment		6,224	12,440

[1] Reimbursements are derived from sale of meals and clothing to service members (10 U.S.C. 7601).

Note: The amounts shown as January 1972 pay increase supplemental/amendment are not distributed to each individual appropriation in the fiscal year 1973 President's budget, but are reflected as a 1-line defense-wide contingency amount. The amounts shown above are estimates, pending final determination of the amounts to be requested when supplemental and amended estimates are formally transmitted.

PRESENTATION FORMAT

Admiral BAGLEY. Mr. Chairman and members of the subcommittee, I am Vice Adm. David H. Bagley, Chief of Naval Personnel and Deputy Chief of Naval Operations for Manpower and Naval Reserve.

I am pleased to testify in support of the fiscal 1973 "Military personnel, Navy (MPN)" and "Reserve personnel, Navy (RPN)" appropriation requests.

I will begin with topics of expressed congressional interest and cover the most important of our other problems, as well as recent accomplishments and goals for fiscal 1973 and beyond.

PERSONNEL REDUCTIONS

In passing the 1972 Defense appropriation bill last December, Congress directed a reduction of approximately $35.5 million in the MPN account, which included reductions in the areas of intelligence and cryptography, headquarters, and public affairs.

The dollar reductions, along with resultant end-strength reductions are being accomplished.

APPLICATION OF CONGRESSIONAL SPECIFIED REDUCTIONS ELSEWHERE

However, there is one factor in our approach to these reductions that I feel obliged to point out.

The $11.6 million cut directed at specific communities was accomplished, in part, by reductions in areas other than those specified. Simply, it was impractical to absorb reductions of the magnitude required, in the communities directed, so late in the fiscal year without serious disruptive consequences.

Chairman ELLENDER. How did you go about doing this Admiral? As I recall, some of these cuts were directed at specific areas.

Admiral BAGLEY. Yes, sir; they were.

Chairman ELLENDER. Intelligence.

Admiral BAGLEY. Intelligence and cryptography, sir.

Chairman ELLENDER. Did you apply them to some other activity?

Admiral BAGLEY. Yes, sir.

DEFENSE AGENCY CONTROL OF INTELLIGENCE AND CRYPTOGRAPHY

Chairman ELLENDER. Who authorized you to do that?

Admiral BAGLEY. This was in our best judgment, sir. We didn't get the cuts, as you know, until December.

The intelligence and cryptography community within the Navy, to a large extent, is not under our direct control but under Defense agencies. Therefore, we cannot say we are going to wipe out x number of billets by our own authority.

We are in the process of negotiating with the Secretary of Defense as to which of these billets under their control, in addition to billets we have cut out of the Navy, will go.

Chairman ELLENDER. How much out of the $372 million cut for intelligence was attributed to you?

Admiral BAGLEY. $9.5 million.

Chairman ELLENDER. How did you implement this reduction?

Admiral BAGLEY. First, we looked at the specific communities that you identified. We did make some reductions in intelligence and cryptography; for example, we reduced our end strengths in those communities by 1,183 people.

Senator PASTORE. As against how many?

Admiral BAGLEY. That was a little under half, I believe, Senator.

HEADQUARTERS REDUCTION

Another area you directed was headquarters cuts of 155. We have done that although the fiscal year 1973 budget will not on first glance show such a cut because of other add-ons.

PUBLIC AFFAIRS: EXTERNAL AFFAIRS DECREASE AND INTERNAL AFFAIRS INCREASE

In the case of public affairs, which was directed at $0.1 million reduction, we were unable to make any reduction in that community. The primary purpose of this, sir, was that the then existing change in emphasis from external affairs in the public relations area to that directed by the Secretary and Admiral Zumwalt to greatly increase our internal affairs to keep our own people better informed.

As a result of that, I believe that we have accomplished to a certain extent the intent of your directed cut by getting out of the external area and refocusing our efforts in the internal.

INTELLIGENCE COST

Chairman ELLENDER. Insofar as reducing the activities, such as intelligence, we thought you had too many personnel. What are you going to do next year about that?

Admiral BAGLEY. Mr. Chairman, in addition to the cut of 1,183 which I mentioned in the intelligence, our fiscal year 1973 budget reflects the further reductions which will carry out the full intent of your direction last year. It is only that we could not do it in the half year that we had available.

Senator PASTORE. In other words, had you carried out the mandate of cutting in the specific services that you were ordered by Congress, you would have had to close down shop completely.

Admiral BAGLEY. In the Navy side.

Senator PASTORE. Rather than do that, you satisfied Congress by making cuts in funds and also making personnel cuts. The full intent of Congress will be reflected in the new year; is that correct?

Admiral BAGLEY. Yes, sir.

1973 BUDGET: NEGOTIATION WITH DEFENSE AGENCIES RESPECTING SPECIFIC BILLET ELIMINATIONS

Senator PASTORE. Your new budget will have the base personnel that Congress mandated last time; is that correct?

Admiral BAGLEY. Yes, sir; that is correct.

Chairman ELLENDER. Has the Defense Department approved all the steps you took?

Admiral BAGLEY. Yes, sir; but as far as the specific billets to be eliminated this year, that is still being negotiated with the Defense agencies.

FAILURE TO ADVISE CONGRESSIONAL COMMITTEES OF INABILITY TO COMPLY WITH MANDATE

Senator YOUNG. This is a serious situation. I understand the problem you encountered in making the reduction. But, once you determined you were unable to make the reduction, did you advise the committees of Congress? This is the first I have heard that you couldn't and didn't make the cut.

Admiral BAGLEY. To my knowledge, the committee was not advised, sir.

Senator YOUNG. Why weren't we? It seems useless to give specific directions if they are ignored and you do not even say why they are ignored.

Admiral BAGLEY. Senator, I can assure you they were not ignored. This was given every bit of attention and study that we could and we made the maximum possible cuts in those communities under the Navy's control, and I am talking of intelligence and cryptography.

Senator YOUNG. I realize you may have had a serious problem. It seems to me you should have notified the committees of Congress who directed that action. One was this committee.

Admiral BAGLEY. I agree, sir. That was our error.

CONGRESSIONAL INTENT

Chairman ELLENDER. Admiral, I am sure you understand that this committee must insist on the services making the reductions directed by the Congress. While these reductions are identified in the reports of the committees and the conference report, rather than in the law, we have to insist that they be treated as if they were in the law.

In this instance we made a specific reduction in the funds requested for intelligence and other activities, and you applied it elsewhere.

Admiral BAGLEY. In the personnel account.

Chairman ELLENDER. Do you think that can be rectified in 1973?

Admiral BAGLEY. Yes, sir; I fully do, in intelligence and cryptology. Our intelligence activities are going to be reduced from 14,737 to a total of 13,937 in fiscal year 1973, sir.

Chairman ELLENDER. Is that reflected in your budget?

Admiral BAGLEY. Yes, sir; that is in our 1973 budget submit.

Chairman ELLENDER. Proceed.

Admiral BAGLEY. Therefore, we calculated our strength cuts in the specified communities on the basis of feasibility and absorbed the remaining reductions by reducing man-year costs throughout the rest of the Navy. Despite the impact on the Navy as a whole, it was the only reasonable option available. We have accomplished the dollar reductions directed and, I believe, fulfilled the intent of Congress to the best of our ability.

PERMANENT CHANGE OF STATION EXPENDITURES

I am acutely aware of the continuing congressional interest in reducing permanent change of station (PCS) moves of military personnel, and I appreciate congressional recognition of our PCS problems as evidenced by your approval of our fiscal 1972 funding request for this program.

The Navy has implemented various steps designed to reduce the required numbers of moves to a reasonable minimum. For example, we have increased minimum tour lengths, stressed reassignment in the same geographical area, and solicited voluntary tour extensions from personnel assigned to oversea bases.

Despite our efforts, we found that the personnel instability generated by past and current inactivations of fleet units and man-year reductions necessitated by congressional budget cuts would require about 18,500 additional permanent change of station moves. Approximately 13,000 of the additional moves were deferred from fiscal 1971 due to the unavailability of funds.

ADDITIONAL FUNDING FOR 1972

You will note that this budget request reflects a requirement for additional funds for fiscal 1972. When priced at current rates, which reflect inflationary increases since the fiscal 1972 budget was submitted, we will require an additional $44.8 million to support our minimum number of required moves.

Chairman ELLENDER. I understand that to meet these additional requirements, you will have to transfer additional funds into this appropriation pursuant to the section 736 transfer authority.

Admiral BAGLEY. That is correct, Mr. Chairman.

REPROGRAMING REQUEST

Admiral MOORE. I might add to that, Mr. Chairman. We do have a reprograming request to accommodate the intent of the Congress in adjusting our fiscal year 1972 PCS travel program by $44.8 million.

Chairman ELLENDER. What is the status of that reprograming action?

Admiral MOORE. That reprograming action is now before the committee.

Senator PASTORE. May I ask a question, Mr. Chairman?

Chairman ELLENDER. Certainly.

Senator PASTORE. To me, there is somewhat of an inconsistency here, perhaps because I may not fully understand what you refer to. You say you have increased minimum tour lengths, stressed reassignments, and solicited voluntary tour extensions in order to carry out the expression of Congress to reduce the number of moves. Then you go on and say: "Because of this, you have had to request additional funds. Now, explain to me, how does this happen? Why does it cost more money? You are not moving so much.

Admiral BAGLEY. We are reducing moves both in fiscal 1972 and 1973 because of these actions and others that we have taken. However, as I pointed out, we had additional moves of approximately 13,000 which we could not fund in 1971 and which we had to move into 1972. This added to the total moves in 1972. So that, in spite of the better management which we have been able to achieve, we still have had an insurmountable task with the money available to make even the minimum necessary moves.

Senator PASTORE. Is this brought about as a result of personnel moves resulting from construction of bases?

Admiral BAGLEY. If I understand your question, we do, as we reduce our fleet——

Senator PASTORE. That is right; you have to move them around more. Is that the point you are making?

Admiral BAGLEY. Yes, sir.

Senator PASTORE. That is the thing I would like to clear up in my own mind. Even though you are reducing the number of moves, the fact still remains that as your establishment becomes smaller, you have fewer personnel to assign to different places. Therefore, they have to move more.

Admiral BAGLEY. That is correct.

Senator PASTORE. Actually, we are cutting down the moves. That is the point I am making.

Admiral BAGLEY. We are, sir, insofar as management application, management procedures. We are cutting down the moves.

Senator PASTORE. You mean you are cutting down the moves insofar as the particular individual is concerned?

Admiral BAGLEY. Yes, sir.

Senator PASTORE. In other words, he is not being moved so much.

Admiral BAGLEY. Yes, sir.

Senator PASTORE. When you take the aggregate, you are moving more?

Admiral BAGLEY. Yes.

Senator PASTORE. Now I get it. For example, if we took a ship out of commission in Newport, we would probably bring the personnel to Norfolk.

Admiral BAGLEY. You would have to reassign them some place else, or we would bring another ship from Norfolk to Newport.

Senator PASTORE. Now it is clear to me. It looked a little inconsistent on paper.

NET PRICE/RATE INCREASE: REPROGRAMING REQUEST

Admiral BAGLEY. $17.7 million of that amount is attributable to net price/rate increases. Accordingly a request for reprograming has been submitted to the Congress for approval to transfer $44.8 million to the PCS account from other funds available to the Department of the Navy.

Chairman ELLENDER. From where will those funds be taken?

Admiral BAGLEY. We have identified it as "Procurement, Marine Corps."

Chairman ELLENDER. Will that money have to be returned?

Admiral MOORE. Those funds are not required for Marine Corps programs.

Chairman ELLENDER. Were they excess?

Admiral MOORE. Yes, sir; they were excess Marine Corps funds from prior year appropriations. They are available and have been earmarked for transfer to this appropriation to take care of the required moves.

Chairman ELLENDER. Proceed.

MANAGEMENT ACTION TO REDUCE MOVES AND COSTS

Admiral BAGLEY. Our fiscal 1973 PCS funding request reflects the various management actions we have taken to reduce both moves and costs. In fact, we were able to make a small reduction in our operational/rotational moves compared to the revised fiscal 1972 moves in these areas.

However, it has not been possible to reduce our overall fiscal 1973 estimate because of the unusally high number of programed accessions and separations; 66 percent of our total estimated fiscal 1973 PCS moves will be necessary to accommodate these accessions and separations.

Further, the extensive loss of skilled personnel will require a rebalancing of available skills throughout our operational forces to maintain current fleet readiness.

Because of the mandatory nature of most of the moves we must fund, as well as our inability to budget for the effects of inflation, any funding constraints would impact directly on our career force since our only alternative would be to reduce deserved sea/shore rotation.

We are, therefore, hopeful that the Congress will approve not only our reprograming request for fiscal 1972, but also the PCS funds contained in the fiscal 1973 budget.

DISCIPLINE AND LEADERSHIP

There has been expressed congressional concern in regard to the state of discipline and the quality of leadership in the military. I would like to provide my own brief appraisal with respect to the Navy.

Aside from the issue of drug abuse, which I will discuss in a moment, there is no cause for concern over the state of discipline in the Navy. I regard overall discipline as excellent and improving.

Roughly 95 percent of our people never become involved in serious disciplinary situations. The number of nonjudicial punishments is declining and courts-martial are steady. Our brig population is at an all-time low. Although there was a slight increase in desertions in fiscal 1971, there has been a decrease in fiscal 1972.

We have experienced increases in separations for cause resulting in large part from adverse attitudes towards military service and incidents of drug abuse. We anticipated reductions in these trends as a beneficial effect of our initiatives in the long term, but are not yet confident that the trend will reduce markedly in fiscal year 1973.

DESERTIONS

Senator YOUNG. How many desertions has the Navy experienced in the last 2 fiscal years?

Admiral BAGLEY. In fiscal year 1970, we had 6,352. In 1971, 6,857. The projected fiscal year 1972 is 5,214.

Senator YOUNG. Do many defect to other countries?

Admiral BAGLEY. We have 297 Navy deserters who are known to be in foreign countries at this time.

Senator YOUNG. Does that rate compare favorably with the previous years?

Admiral BAGLEY. You are talking about desertion rates?

Senator YOUNG. Yes, sir.

Admiral BAGLEY. The projected rate of desertion per thousand for this current fiscal year is 9.7 as opposed to an 11.1 for fiscal year 1971. In other words, we are dropping about 1.4 per thousand.

Senator YOUNG. Admiral, please discuss the problem of desertion generally, the penalties, accommodations on return, and similar matters.

Admiral BAGLEY. Yes, sir. Although there has been a gradual increase in desertion rate (11.1 per 1,000 in fiscal year 1971, as compared to 9.1 per 1,000 in fiscal year 1965), the rate of desertion is not alarming particularly when consideration is given to the apparent nationwide attitude of the present generation toward the military service, Vietnam involvement, social conduct, etc. The maximum penalty for conviction of desertion is 5 years confinement, a dishonorable discharge, reduction in rate to E–1, and forfeiture of all pay and allowances. However, very few Navy members are convicted of desertion (approximately 48 in fiscal year 1970). The maximum penalty for conviction of unauthorized absence of over 30 days is 1 year confinement and a dishonorable discharge, reduction in rate to E–1, and forfeiture of all pay and allowances.

Charges and specifications are preferred in all cases to insure against the running of the statute of limitations; thus, enhancing the policy that returned deserters be tried by court-martial. Every practicable effort, including Federal Bureau of Investigation (FBI) assistance and entry of the deserter's description in the National Crime Information Center is made to apprehend deserters as expeditiously as possible. When a deserter surrenders or is apprehended he is immediately assigned to an activity with facilities for confinement and court martial. Disciplinary action is expected to be prompt and consistent under the Uniform Code of Military Justice (UCMJ).

RETENTION

Chairman ELLENDER. Proceed, Admiral.

Admiral BAGLEY. When Admiral Zumwalt became the Chief of Naval Operations in July 1970, he determined that the top priority of the many tasks facing the Navy was to stop the downward trend of retention by making the Navy more attractive, not only to attract the type of young people we need, but to retain those members necessary for a career-motivated force.

Only by meeting this challenge could the Navy be competitive in the manpower market. Now this challenge is becoming even greater as we start to compete for people without the assistance of draft pressure. Secretary Chafee and Admiral Zumwalt have led the way in instituting a change of personal attitudes toward a fuller recognition of the dignity and importance of individuals.

ENLIGHTENED LEADERSHIP

I feel that the strongest single factor in accomplishing these goals is leadership. Our people are brighter, better informed and more actively involved than at any time in history. Naval leadership has never had a greater challenge.

Enlightened leadership at every level is our goal. In accomplishing this aim, we are actively pursuing programs designed to strengthen our leadership in order to better lead the youth of the 1970s. These attempts are beginning to take hold and I am pleased to report that first-term enlistments are improving.

DRUG AND ALCOHOL ABUSE

We have embarked on a comprehensive drug education and rehabilitation program that is already showing excellent results.

Our screening program is using chemical urinalysis. Over 115,000 tests have been conducted in the Navy and Marine Corps, with a positive rate of about 0.3 percent.

About 5,000 Navy personnel have applied for exemption from prosecution for use or possession incident to use of drugs, and have been processed through the Navy's drug rehabilitation program, which provides for two levels of treatment and counseling.

The first level consists of two major rehabilitation centers at Jacksonville, Fla., and Miramar, Calif., for those Navy and Marine Corps men who are severely physically or psychologically addicted and require full-time rehabilitative treatment.

The second level consists of a network of local rehabilitation and counseling centers which we are establishing throughout the Navy for those who require part-time counseling but can continue on their assigned jobs.

The combination of the two-level rehabilitation and counselling program and an expanded drug education program has resulted in a number of men being returned to productive employment and in an increased awareness of the dangers of drug abuse.

Chairman ELLENDER. I wish you would describe in a little more detail the situation at the present time in regard to drug use in the service, including an indication as to whether it is increasing or decreasing, the measures that have been taken to combat it, and the effectiveness of those measures.

Admiral BAGLEY. Mr. Chairman, at the present time the Navy is using four methods to clearly identify the magnitude of the drug problem. These methods are:

(*a*) The number of exemptions in the drug exemption program.

(*b*) The number of positive urinalyses in the urinalysis screening program.

(*c*) The number of drug-related Naval Investigative Service (NIS) investigations.

(*d*) The number of serious medical illnesses or deaths related to drug use.

Methods (*a*) and (*b*) are our primary means of identifying drug users.

As I have indicated, the exemption program, initiated in July 1971, has surfaced 5,198 admitted drug users through February 11, 1972. This has averaged out to approximately 350 exemptions/week, U.S. Navy (USN) and U.S. Marine Corps (USMC) combined.

I have already indicated that urinalysis screening, initiated in June 1971, has produced a confirmed positive rate of 0.3 percent of 87,850 U.S. Navy tests administered through the end of January 1972. Random screening of some naval personnel will begin in March 1972, with worldwide random screening to be effect by July 1972.

One other good indicator of the extent of the drug problem is the number of administrative discharges for drug abuse and related offenses:

1968	2374
1969	3808
1970	5672
1971 (through November)	7117

Thus, in 1971 through the end of November, over 7,000 members were administratively discharged for drug abuse. In the same period approximately 4,000 members were retained on active duty. Both of these figures are greater than any previous yearly totals.

The above urinalysis figures show that drug addicted individuals account for only a very small percentage of the total number of identified drug abusers. The environment in which most Navy members live makes concealment of drug addiction extremely difficult. The majority of identified Navy drug abusers are not continuous users and are not physically dependent upon drugs. Even though the number of identified drug abusers increased significantly in 1971 over 1970, this is not proof in itself that the incidence rate of drug abuse has increased due to recently instituted identification methods, especially the exemption program. At this time, the Navy does not know whether the drug problem is increasing or decreasing in intensity.

With regard to drug abuse the Navy is operating in five areas which we believe constitute a total effort providing assistance to drug abusers and creating an environment in which drug abuse can be effectively prevented.

The first area is education and information aimed at the individual perspective particularly in relation to the actual social, medical, and legal aspects of drug use. We are constantly on the alert to counter a great deal of misinformation prevailing in the drug scene and also improve our own credibility image. To do so, we will, within 2 months, be spreading Navy-wide an audio-visual programed drug education methodology that has been highly utilized in the submarine force for almost 2 years. We are training petty officers in a 5-week course in all aspects of drug control and in optimum use of the aforementioned audio-visual programs.

The second area is concerned with recruit screening. The majority of our identified drug abusers admit to preservice use of drugs of some kind. Consequently, we are seeking means to assist recruiting personnel to enable them to better screen drug users and problem personalities during the recruiting process. We are also currently screening all Navy recruits by chemical tests for opiates, barbiturates and amphetamines use within the first 24 hours of their reporting to recruit training centers.

Third, we are proceeding with plans to enhance our enforcement efforts to detect pushers and traffickers of illegal drug substances on Naval establishments.

Fourth, we are working with commands to increase their awareness that environmental and organizational conditions may in some cases be enhancing drug abuse. Commands are in turn enabled to evaluate conditions which their personnel claim lead to the use of drugs. This is being carried out both in our introduction of the commanding officer to our drug education program as well as in a broader command development program designed to improve overall leadership at all levels within our commands.

The final area is that of sincere concern for the individual with a drug abuse problem. Increased identification and treatment methods are designed to help the drug users.

On July 9, 1971, Secretary of the Navy Chafee promulgated the Navy's exemption program, which offers a degree of protection to the individual for voluntary admission of drug use. This program has been effective in surfacing many drug abusers as shown above. Integral parts of the program are a required medical examination and command recommendation. Based on these recommendations, decisions are made at the Bureau of Naval Personnel level concerning necessary treatment and retention on active duty.

Regardless of the identification procedure used, identified drug abusers are given physical examinations at the nearest medical facility. If detoxification is needed, this is accomplished through the nearest capable medical facility. Most detoxified personnel and those requiring extensive rehabilitation are sent to either the Naval Drug Rehabilitation Center at Miramar, Calif., or Jacksonville, Fla. I have already mentioned that.

The Navy believes that the above program will provide the actual or potential drug abuser an acceptable alternative to drug abuse. Its effectiveness will have to be continuously monitored to insure that all avenues are explored in the fight against drug abuse.

Alcohol Rehabilitation and Education Program

Similar to our efforts in the drug abuse area, the Navy has established an alcohol rehabilitation and education program. Since 1967, we have had a pilot program at Long Beach designed to find ways to combat the great loss of productivity resulting from alcoholism.

Public Law 92-129: Establishment of Alcoholic Rehabilitation Center, Norfolk, Va.

In response to the desires of the Congress expressed in Public Law 92-129, we have recently established a second alcohol rehabilitation center at Norfolk. I have under consideration further expansion of this program as required.

Race Relations

The Navy is fully committed to eliminating discrimination and bias, and we have taken significant steps to achieve this goal. Perhaps foremost of these is the appointment within each command of a special assistant for minority affairs, whose responsibility is to represent all minorities. These assistants are valuable sources of information and guidance and enable commanding officers to more effectively carry out their programs.

Chairman Ellender. Is this primarily among the whites and blacks, or do you have any other minorities?

Admiral Bagley. We have Chicanos, Mexican-Americans; we have Filipinos, but primarily the thrust is in the large black community as far as the minorities are concerned.

Evidence of Dissent

Senator Young. What has been the history in the past year as to dissent in the service?

Admiral Bagley. Mr. Chairman, members of the naval services are continuously subjected to dissident philosophy through such mediums as underground newspapers, literature, and personal contact through discussion groups, which operate out of the various antiwar coffee houses that are set up around military bases to attract the young enlisted men, and more recently through activist groups on naval units themselves. There are some organizations that are primarily made up of military membership that direct disident philosophies toward their contemporaries. These groups have included both officer and enlisted personnel.

As to the effect of antiwar groups on enlistment programs, we do have indications that numerous organizations carry out antimilitary activities mostly through the "Draft Counseling Programs." These draft counseling groups are well-publicized and carry out an active campaign to attract prospective military candidates, ostensibly to

counsel them on methods and means to avoid military service. Exposure of an individual to these groups often leads to a new activist in the antimilitary field. The counseling activities of these organizations are not limited to civilian personnel. They also render services to dissatisfied members of the military and advise them as to the most expeditious means of obtaining a discharge from the service.

In general, the antimilitary effort is loosely organized. There is no national headquarters per se. There, is however, a philosophical control exerted by both direct influence and through monetary contributions to local organizations by national organizations such as the GI Press Service, the GI Office and The Resistance.

The GI Press Service controls the publishing of most of the underground military newspapers. The GI Office provides and coordinates financial aid for those publications as well as for other dissident related activities. It has been noted that both organizations have a multiple leadership in that individuals such as Mark Land, David Harris, Don Duncan, Joan Baez, and Jane Fonda have been prominent in varying degrees in the hierarchy of these groups. These organizations, and others similar to them, maintain an open line of communication and frequently join in planning sessions pertaining to specific objectives. Exchange of ideas and methods are produced through these channels and the result is the development of more successful tactics to be used against the military in general. Presently examples of organized tactics is the ongoing campaign to prevent the deployment of carrier units to Southeast Asia. To this time four U.S. Navy carriers have been the target of this activity, ostensibly called the Stop Our Ship Movement.

The first encounter with the Stop Our Ship Movement took place in October 1971. Nine crewmen from the U.S.S. *Constellation* took sanctuary in the Christ the King Church, San Diego. Considerable public interest was generated through the media and underground newspapers. A public ballot, organized by the SOS movement, was cast to determine whether the "*Connie*" should sail. According to antiwar sources the ballot was 89 percent in favor of staying home. It has been learned that the practice of ballot box stuffing was widely used. Civilian activists and groups were prominent in the activities centered around the SOS movement. David Harris of the Peoples Union was one of the notables.

The nine crewmembers who had sought sanctuary in the church were removed by Federal authorities and immediately flown back to the *Constellation*. Subsequently eight of the individuals were discharged from the Navy. Several of these individuals continue to be active in the SOS movement and are generally present in the area of deploying carriers functioning as activists to encourage further sanctuary activities by other Navy men.

The second major incidence of dissident activity was directed toward the U.S.S. *Coral Sea* in November 1971. In this case, numerous civilian groups were active and the sanctuary issue reached new proportions with 12 religious groups in the San Francisco area offering sanctuary to dissident sailors. The issue was further enlarged with a resolution of the Berkley City Council declaring the entire city of

Berkley, Calif., as a sanctuary and forbidding any city official from aiding Federal authorities in apprehending any one in sanctuary.

Ironically not one of the dissident sailors from the *Coral Sea* sought the sanctuary that was proffered. Numerous demonstrations were directed at the Alameda Naval Air Station with an effort to prevent the crew from getting to their ships the morning of the deployment. Close coordination between military/Federal authorities and the local police agencies completely negated the efforts of the antiwar activists.

The third carrier involved was the U.S.S. *Hancock* in January 1972. As usual local civilian dissident groups were active and as a result one individual sought sanctuary. He was subsequently apprehended and returned to the ship.

The fourth and final carrier involved in the SOS movement is the U.S.S. *Kitty Hawk*. The ship sailed February 17, 1971, for Southeast Asia. Seven individuals sought sanctuary in a local church to miss the ships sailing. All were apprehended and returned to the ship shortly after sailing.

As mentioned there are dissident groups, primarily composed of active duty personnel which tend to draw lines of association between officer and enlisted ranks; however, there is some commingling among them.

Within the Navy officer corps, the major antimilitary organization is the Concerned Officers Movement (COM). COM was formed in 1969 in Washington, D.C., originally with a definite Navy identity. Now there is membership from all services, including the Coast Guard and Public Health Service. For the Navy, the greatest amount of interest is in the San Diego and San Francisco areas. Additional activity in varying degrees exists in Boston, Norfolk, Charleston, Pensacola, Seattle, Long Beach, Kodiak, Hawaii, and Vietnam.

At the outset, COM's stated objectives were to criticize national policies and national leadership, to expose injustices, and to improve the lot of enlisted personnel. The purpose of the group now seems to be changing from faultfinding to active protest. Some of this changing in policy can be attributed to increasing association with other antimilitary organizations such as the National Peace Action Coalition, the Pacific Counseling Service, the GI Office and GI Press Service.

The local COM chapter was actively involved in organizing participation by active duty military members in the April 24, 1971, GI protest in Washington, D.C. On the west coast, COM members have been able to generate protest demonstrations with regard to the sailing of the various carriers for Southeast Asia.

The enlisted counterparts of the Concerned Officer Movement are the Movement for a Democratic Military (MDM) and the American Service Men's Union (ASU). Both of these organizations have similar platforms and are currently organizing under the principle to disrupt the military from within. Both organizations have the capacity and propensity to lean toward violent action but have thus far been held in check by administrative means.

In summary, the organized efforts of the various antimilitary groups have not been very successful in their effort to disrupt the Navy. A small number of Navy men have become involved in anti-

military activities and some local base and unit disruptions have taken place. The naval service has been able, thus far, to handle any problems arising from these incidents through administrative actions and they have yet to pose a serious threat to the internal security of the Navy. Future activity, more organized, with better trained individuals could present a serious problem.

RECRUITING

In recruiting, we have established a minority officer billet at each of our main recruiting stations. This and other initiatives to improve minority recruiting have produced significant gains.

It is worthy of note that to date during fiscal year 1972 the black accessions are 12 percent. This is directly representative of the percentage of blacks in the population at large. And, overall, we have 18 percent more minority enlisted personnel on active duty than we did in fiscal 1970.

COMMISSIONED OFFICERS

In the officer community, we predict that minority officers commissioned for fiscal year 1972 will be 58 percent higher than fiscal 1970. Last summer 43 blacks were sworn in as midshipmen at the Naval Academy—the largest number in history.

COMMUNICATIONS AND UNDERSTANDING OF CULTURAL DIFFERENCES

The goal of all our programs is to increase communications and improve understanding of cultural differences among the races. Our programs to achieve this goal consist of a basic program which has been adopted at the Naval Academy and other officer and enlisted schools, at the recruit training centers and at every command level, both ashore and afloat.

In addition, many local commands have developed programs which supplement this basic course. The combined effect of these programs has enabled us to take vigorous steps toward achieving equal opportunity for all Navy men.

GRADE STRUCTURE

Congress has expressed concern in regard to the military grade structure. Over the last 25 years, growth in the senior officer grades has occurred. We have had three wars in this generation, each of which involved large numbers of officers entering our service and being given sophisticated and expensive training. Some of these officers opted to join the career force.

The World War II group are now senior captains who will be leaving the Navy each year until 1975; the Korean war group is largely in the grade of commander.

COMBATANT-SUPPORT PERSONNEL RATIO

Chairman ELLENDER. Admiral, I note on page 19 of the justifications that at the end of fiscal year 1973 of your estimated strength of 601,672, you expect to have 220,930 assigned to combat forces, with the remainder of 380,742 assigned to noncombat forces.

Admiral BAGLEY. That is correct, Mr. Chairman.

Chairman ELLENDER. The tabulation entitled "Schedule of Combat and Noncombat Forces" will be included in the record at this point.

(The tabulation follows:)

SCHEDULE OF COMBAT AND NONCOMBAT FORCES (END STRENGTHS)

Type of unit (based on fiscal guidance categories)	Fiscal year— 1971	1972	1973
1. Force mission (combat forces):			
a. Europe and related areas	30,037	28,798	29,924
b. Western Pacific	37,423	33,155	31,010
c. Other foreign countries	1,101	1,044	1,031
d. United States, territories, and SEA	220,248	226,388	220,930
2. Other mission:			
a. Europe and related areas	6,023	5,775	5,789
b. Western Pacific	4,562	3,598	3,279
c. Other foreign countries	907	1,095	1,097
d. United States, territories, and SEA	30,075	28,285	26,469
3. Training:			
a. Europe and related areas	12	22	22
b. Western Pacific	70	69	69
c. Other foreign countries	1	2	2
d. United States, territories, and SEA	124,849	124,198	131,064
4. General support (other than training):			
a. Europe and related areas	6,116	5,834	6,311
b. Western Pacific	7,374	6,527	6,757
c. Other foreign countries	1,071	842	1,009
d. United States, territories, and SEA	153,154	136,564	136,909
Total	623,023	602,196	601,672

Note: The "Force mission" category consists of strategic, and, tactical air, naval, and mobility forces. The "Other mission" category consists of intelligence, communications, research and development, and support to other nations. The "Training" category consists of specialized, recruit, professional, other military training, and Naval Academy. The "General support" category consists of base operating support, medical support, command, logistics, and individual support.

COMBAT AND NONCOMBAT FORCES

Senator ELLENDER. The table on page 1–19 of the justifications indicates that you plan an overall reduction of 524 military personnel in fiscal year 1973. But it also shows that you plan a reduction of 6,490 in combat forces from 289,385 in 1972 to 282,895 in 1973, while you show an increase of 5,966 other forces, from 312,811 in 1972 to 318,777 in 1973. Why are you increasing your other mission forces at the expense of the combat forces?

Admiral BAGLEY. Mr. Chairman, while we are planning a relatively small increase in our "other than combat" forces, it will not be at the expense of combat forces.

Manpower requirements for combat forces are related to the number and type of ships and aircraft, both of which were planned decreases fiscal year 1972 to fiscal year 1973 (ships, 63, and aircraft, 162). Consequently, manpower related to these forces are properly planned to decrease. In the "other than combat" areas we are planning increases for programs to (1) enhance career service, such as career counselors, human relations, All Volunteer Force, deprived ratings, and (2) provide an adequate training posture.

Chairman ELLENDER. Admiral, how many of your total personnel do you figure are in actual combat, the actual fighting men on your ships and in your aircraft?

Admiral BAGLEY. I have some figures here which would indicate that our combat forces, the people who man the aircraft and the ships, are 48 percent of our total strength which, in response to your question,

then would be about a 1-to-1 ratio. That is throwing everything else——

Chairman ELLENDER. One man to take care of a combat man?

Admiral BAGLEY. Yes, sir. Mr. Chairman, I would like to point out that we have sort of a unique situation here. Clearly, we could probably get by with less if we kept everybody in the Navy at sea or in the air for their entire career, which I think would be impossible. Therefore, part of this additional 50–50 break is attributable to the need for the sea-shore rotation.

Chairman ELLENDER. Proceed.

OFFICER GRADE STRUCTURE REDUCTION

Admiral BAGLEY. We are taking steps to reduce the grade structure of our officer corps. We have already achieved a 5-percent reduction in the number of unrestricted line commanders and a 15-percent reduction in unrestricted line captains since 1968.

These reductions have been obscured to some extent by the grade growth in the restricted line and staff corps communities. This growth has been the result of technological advances requiring special skills. Increases in the entry level grades in the health and professional corps have likewise tended to drive up the grade structure within each staff corps and increase the overall Navy average.

As the World War II captains leave service, we do not plan to fill all vacancies by promotion. We intend to continue the reduction in grade structure consistent with providing equitable promotion opportunity required to maintain a responsive officer corps.

DISTRIBUTION OF MANPOWER

Navy manpower is distributed in four broad categories. In fiscal 1973, 47 percent of our people will be serving in combat forces. Those are the crews of our ships, submarines, and air squadrons; 25 percent will be in "General support," which consists of units providing base operation, medical, logistic, and other support.

Twenty-two percent of our people will be in "Training," either as students, instructors or training staff members. The remaining 6 percent fall into "Other mission" categories. This includes intelligence, communications, research and development, and support to other nations.

DETERMINATION OF MANPOWER REQUIREMENTS

Prior to 1967, we determined our manpower requirements on the basis of experience and historical background. In 1967, we initiated a manning document program that provides a more objective appraisal of Navy manpower requirements. Briefly, it involves application of industrial engineering survey techniques to determine manpower requirements for every unit in the Navy. Our approach has been spartan. Our requirements for shipboard watchstanders, for example, are based on an average 74-hour workweek at sea.

The change to the manning document system is not yet complete. Nine-tenths of our ships, half of our air squadrons, and one-fifth of our shore facilities are now covered by manning documents. That

represents about half the billets in the Navy. We expect to achieve 100 percent coverage by 1975.

We are also in the research and development stage with a job task analysis program that will further refine our documentation procedures by providing a more objective analysis of the knowledge, training, and experience required of each grade in each specialty in the Navy. It will be several years before this procedure is implemented and full coverage achieved.

In summary, I believe that the methods we use to determine Navy manpower requirements are excellent and improving.

I will submit for the record a more detailed discussion of the development and validation of Navy manpower requirements.

(The information follows:)

DETERMINATION OF NAVY MANPOWER REQUIREMENTS

Navy military manpower requirements are derived through the Planning-Programming-Budget cycle. Early in the calendar year, the Secretary of Defense issues Strategic and Tentative Fiscal Guidance memoranda which provide fiscal levels, broad guidance on balancing forces with material support, an estimate of force capabilities proposed, and the proposed allocation of resources by mission and support category. Within the parameters established by these memoranda, Navy reviews existing approved mission forces in relation to various scenarios and determines the risks involved when compared to the Joint Chiefs of Staff prepared Joint Strategic Operations Plan (JSOP) forces and objectives. These deliberations include a great number of considerations such as weapons system trade-offs, long-range procurement requirements, force levels, support requirements, and so forth. Finally, the risks are identified and a force mix is established which will permit Navy to remain within the constraints while providing the greatest possible capability in support of Navy's mission and national objectives.

With the determination of the force mix, associated force manpower requirements are determined on the basis of factors applicable to specific ship and aircraft types. The primary device for establishmentof these factors is the Navy Manning Documentation Program.

Navy has a continuing manning documentation effort. Because of the uniqueness of the various entities of the Navy, separate but similar programs have been established for ships (Ship Manning Document), aircraft squadrons (Squadron Manning Document) and the shore establishments (Shore Manning Document). In essence, the program includes a tabulation of workload associated with all facets of operations and maintenance in an organization with the Navy, and translating that workload into manpower requirements. The methodology includes the application of selected work study and other industrial engineering techniques to the analysis of operations, maintenance, training, support, administration, etc., in order to quantify workload and distribute it in the most efficient manner. By using these accepted scientific techniques, minimum essential manpower to permit a given class of ship or aircraft squadron to perform its mission is established. Details of the workweek criteria on which the Manning Document Program is based are included herein. The basic elements are the total man-hours required for watches, training, service diversions, and scheduled work as modified by productivity factors. With the programed workweek at sea ranging from 66 to 74 hours, it is evident that the Navy is a long way from 40-hour workweek generally accepted by industry.

With the determination of activity manpower levels necessary to perform prescribed missions, manpower is allocated to individual activities which are needed to support Navy's portion of the total Defense requirement. The manpower levels assigned are those determined to be the minimum acceptable to insure fulfillment of assigned functions. The broad categories to which total Navy manpower is distributed are forces (including ships and aircraft squadrons), training, supporting activities and other. Other requirements include manpower allocated to Joint Military Groups, Navy support to International/Other

Services/Other Governmental Activities, and Unavailables such as transients and hospital patients. Using estimated fiscal year 1973 requirements as a base, the approximate percentage distribution of manpower is:

	Percent
Forces	47
Training	22
Support	25
Other	6

Approved military end strength for the Navy is provided by the Office of the Secretary of Defense after a thorough review and adjustment of the manpower requirements as submitted by Navy. Resulting manpower authorized for Navy has therefore been fully justified to OSD.

The rapid manpower reductions experienced in the past 2 years have generated some imbalances in Navy military manpower budget programs. Our programs are continually reviewed to compensate for these problems. No change to the fiscal year 1973 average manpower authorization or dollar requirements is anticipated.

Navy standard workweek criteria—Standard workweek for enlisted personnel afloat

	Hours
At sea:	
Watchstander	74
Nonwatchstander	66
In port:	
Watchstander	45
Nonwatchstander	41

1-in-6 duty rotation minimum objective.

STANDARD WORKWEEK ROUTINE SPREAD

	Watchstander		Nonwatchstander	
	At sea	In port	At sea	In port
Watch	56.00	9.33		
Training	2.00	2.83	3.00	3.00
Service diversions	2.50	3.37	3.00	3.50
Scheduled work	13.50	28.67	37.50	31.00
Unscheduled work		.80	22.50	3.50
Total workweek	74.00	45.00	66.00	41.00

SERVICE DIVERSION DEFINITION

Those actions required of personnel by regulations or the nature of shipboard routine which must be or are normally accomplished during normal off-watch working hours and which therefore deduct from individual capacity to do productive work.

SERVICE DIVERSION ELEMENTS, CONDITION III, AND TIME SPREAD

[In hours]

	Watch-stander	Nonwatch-stander
Quarters (musters)	1.00	1.50
Training	2.00	3.00
All other, includes sickcall, pay line, haircut, personnel office, other	1.50	1.50
Total	4.50	6.00

PRODUCTIVE ALLOWANCE FACTOR DEFINITION

Percentage allowance applied to basic productive work requirements to reflect those delays arising from fatigue, environmental effects, personal needs and unavoidable interruptions, which serve to increase the time required for work accomplishment.

Application—20 percent factor applied to all maintenance transactions.
Example:

1.00 maintenance work required
×.20 productivity allowance

1 hr. 12 min. allotted to complete transaction

MAKE READY/PUT AWAY ALLOWANCE FOR PREVENTIVE MAINTENANCE TRANSACTIONS

DEFINITION

Time allowance for tool drawing, publications gathering, equipment entry, transaction recording and put away. (For preventive maintenance (PM) only.)
Application—30 percent applied to all PM transactions.
Example:

1.00 PM work required
×.30 make ready/put away allowance

1 hr. and 18 min. alloted to complete transaction

Workweek recapitulation by function/hours condition III

	Hours
Watchstander:	
Available for work	74
Watchstanding	−56
Available for maintenance	18
Total service diversion	−4.5
Available for maintenance	13.5
Non-watchstander:	
Available for work	66
Total service diversion	−6
Available for maintenance	60

PERSONNEL TURBULENCE

Admiral BAGLEY. I will now shift my discussion to a more general level and describe what I consider to be the most important of our current problems, some recent accomplishments and goals for fiscal 1973 and beyond.

Personnel turbulence, generated primarily by force level, strength and budget reductions and by low retention, continues to inhibit optimum personnel management.

The cumulative reductions we have experienced since 1969 have necessitated the inactivation or relocation of ships, air squadrons and shore stations which, in turn, have made it necessary to transfer people and relocate units to maintain a balanced readiness posture.

Men and families have had to make disruptive, unplanned-for and expensive moves, orderly career patterns have been interrupted, and morale has generally been adversely affected.

To meet unplanned-for strength and budget cuts, we have been obligated to release many personnel from active duty 2 months to 1 year early, thus reducing amortization of training investments and degrading stability and readiness in individual units.

Low retention has contributed to turbulence by generating a rapid personnel turnover and increasing our training requirements.

We are looking forward to more stability in force levels and career personnel strength in fiscal 1973. The great challenge we face in fiscal 1973 is to minimize the turbulent effects on our operating forces that will be influenced by the large numbers of accessions and separations which are reflected in this budget.

RETENTION

As I have noted, low retention has had a major impact on personnel management and fleet readiness. We have experienced a very encouraging upturn in 1971 and 1972. First term reenlistments have risen from 10 percent in July 1970 to 20 percent today. However, we still have critically low retention in many skill communities. 16 enlisted ratings have first term reenlistment rates below 10 percent. Most of these ratings are made up of personnel highly trained in skills with ready civilian utility.

One manifestation of low retention is a personnel shortage in pay grades E–4 and E–5. For example: In the yeoman rating our overall manning is 96 percent, but second class yeoman—pay grade E–5—manning is 81 percent.

Chairman ELLENDER. What is your lowest pay grade?

Admiral BAGLEY. The lowest pay grade is E–1.

Chairman ELLENDER. What does that amount to per month?

Admiral BAGLEY. $288 per month.

Chairman ELLENDER. The lowest is $288 per month and clothing, food, and so forth, are furnished?

Admiral BAGLEY. Yes, sir. This is the basic pay and allowances.

Chairman ELLENDER. Proceed.

Admiral BAGLEY. This shortage of "middle" grades directly affects the experience level in these critical ratings.

VARIABLE REENLISTMENT BONUS

Historically, our most effective single tool to improve enlisted retention has been the Variable Reenlistment Bonus (VRB). In enlisted ratings where a VRB is not authorized, the aggregate first term retention rate is 13 percent. In ratings where a VRB is authorized, the rate is 25 percent.

NUCLEAR SUBMARINE OFFICER CONTINUATION PAY

Similarly, the nuclear submarine officer continuation pay, authorized in 1969, has reversed the downward retention trend in that community. Whereas retention had dipped to as low as 28 percent, it is now up to 41 percent and appears to be improving toward our goal of 50 percent.

NUCLEAR TRAINED ENLISTED PERSONNEL

By contrast, retention of nuclear trained enlisted personnel, who have no continuation pay presently authorized, is critically low—13 percent and dropping.

AVERAGE VARIABLE REENLISTMENT BONUS

Chairman ELLENDER. What is the average VRB for the Navy?

Admiral BAGLEY. For the 1973 budget we have asked for $66,123,000. For this current fiscal year we asked and received $63,836,000.

Chairman ELLENDER. Does that amount include the increase in pay for submarine officers and enlisted?

Admiral BAGLEY. No, sir, this is strictly the variable reenlistment

bonus. Mr. Chairman, the average VRB payment is about $6,700 per person.

Chairman ELLENDER. Does that come about every 4 years?

Admiral BAGLEY. It only comes one time, sir, one time for one person.

Chairman ELLENDER. But your enlistment is——

Admiral BAGLEY. Either 4 or 6 years.

Chairman ELLENDER. Is there any difference made in the VRB for four and six?

Admiral FINNERAN. Yes, sir; we give more for the longer term of contract. If a man obligates himself for 4 years, he will get twice as much bonus as he would if he only obligated himself for two.

Chairman ELLENDER. When is this money paid to him? It is paid at the moment he reenlists, or is it paid over the term that he enlists for?

Admiral FINNERAN. Both ways, sir. We are authorized to pay not more than 50 percent of the budgeted amount in lump sum payments that will provide the individual with the full benefit of the bonus at the time he reenlists. The remainder of those entitlements must be allocated on an annual installment basis over the period of the enlistment.

Chairman ELLENDER. I see. All right, proceed.

NEW AUTHORIZATION REQUISITE FOR NUCLEAR SUBMARINE OFFICER CONTINUATION PAY

Admiral BAGLEY. Authorization for nuclear submarine officer continuation pay will expire at the end of fiscal 1973. We will be requesting an extension of the authorization and inclusion of nuclear trained surface officers, where retention is down to 11 percent and becoming critical. In light of our expanding nuclear surface fleet, I am very concerned with this situation.

OTHER OFFICERS

As for the remainder of our officer corps, resignations have decreased and augmentations to regular status have increased. But we continue to have problems in the retention of surface line and medical officers. These two communities will constitute our most serious officer retention problems as we move into a zero draft environment. In the aviation officer community we are below goal, but showing an upward trend.

OVERALL RETENTION IMPROVEMENT

I don't want to underemphasize that overall retention has improved in fiscal 1972. There is some indication that the state of the civilian employment market has contributed. Clearly, an important factor has been the tremendous emphasis Secretary Chafee and Admiral Zumwalt have placed on people-oriented programs. The two major military pay raises in fiscal 1972 are expected to provide a large boost to our recruiting and retention efforts.

RETENTION STATISTICS

I will provide for the record more detailed statistics on our retention rates.

(The information follows:)

MONTHLY NAVY RETENTION SUMMARY—FISCAL YEAR 1972 AS OF FEB. 1, 1972

OFFICER RETENTION RATES BY WARFARE SPECIALTY, AT MINIMUM SERVICE REQUIREMENT PLUS 2 YEARS

[In percent]

Specialty	Objective	1972[1]	1971	1970	1969	1968	1967
Surface	45	14	17	16	18	17	20
Nuclear submarine	62	41	33	33	[2] 50	[2] 58	[2] 72
Pilot	47	34	27	25	31	43	57

[1] Projected

[2] Nuclear submarine retention rates prior to fiscal year 1970 are estimated rates used for comparative purposes. Because of the large number of indirect inputs from various year groups into nuclear power training prior to fiscal year 1964, establishment of exact retention rates for fiscal years 1966–69 using the present standard (minimum service requirement plus 2 years) is not possible.

ENLISTED REENLISTMENT DATA BY TERM

Term and item	Fiscal year— 1972, month of January	1972, through January	1971, through January	1971	1970	1969
1st:						
Rate (percent)	24	21	15	17	10	16
Reenlisted	1,380	9,923	7,520	13,304	12,844	12,510
Eligible	5,775	48,328	50,538	78,210	124,374	76,885
2d:						
Rate (percent)	[1] 81	[1] 77	78	77	69	65
Reenlisted	[1] 817	[1] 5,383	6,031	10,175	11,336	10,983
Eligible	[1] 1,006	[1] 6,951	7,987	13,135	16,387	17,027
Other:						
Rate (percent)	[1] 98	[1] 98	98	98	96	95
Reenlisted	[1] 1,819	[1] 11,846	11,090	19,444	18,500	13,452
Eligible	[1] 1,866	[1] 12,107	11,278	19,790	19,245	14,129
Career:						
Rate (percent)	92	90	89	90	84	78
Reenlisted	2,608	17,081	17,121	26,619	29,836	24,434
Eligible	2,846	18,945	19,265	32,925	35,632	31,156
Total:						
Rate (percent)	46	40	35	39	27	34
Reenlisted	3,938	27,004	24,641	42,923	42,680	36,944
Eligible	8,621	67,273	69,803	111,135	159,979	108,041

[1] The source of 2d term and other reenlistment data is the E211A–I report, which varies slightly from the E183 series in career totals.

RECRUITING IN DRAFT-FREE CLIMATE

Admiral BAGLEY. We have been operating in a virtually draft-free climate since the fall of 1971. In my view this is the most challenging issue in the personnel field today. We have already experienced recruiting shortfall. This takes on added significance when viewed in the light that fiscal 1973 will be a peak year in terms of recruiting requirements. We need to recruit over 130,000 enlisted personnel, the third highest accession requirement since the Korean War.

The elimination of routine draft calls will affect the Naval Reserve in much the same way as it will affect the active Navy. Draft pressure has been even more of a factor in Reserve recruiting than in active force recruiting.

The answer to our recruiting problem is harder work on the part of our recruiters, the development of imaginative recruiting and retention related programs, and a successful effort to improve the image and attractiveness of naval service.

Our major unilateral efforts to improve recruiting have included the establishment of a Navy recruiting command which combines our active and reserve recruiting efforts, and continued emphasis on providing top quality people for recruiting duty.

As you are aware, the major investment in moving toward an all volunteer force is reflected in the two recent pay raises. In addition, funds were made available in fiscal 1972 to improve the attractiveness of military service. In the case of the Navy this included an increase in recruiting manpower by 792. This investment is approaching its full application at this time. The fiscal 1973 budget request provides for an additional 73 recruiting personnel. The impact of the large recruiting requirements in fiscal 1973 supports this additional manpower request based on our best estimate under zero draft conditions.

OFFICER PROCUREMENT

In contrast to our enlisted recruiting difficulties, our officer procurement programs are generally meeting requirements with one significant exception. Our medical officers, and to a lesser extent our dentists, are heavily draft motivated. In the absence of a doctor draft, we anticipate a serious shortfall. In anticipation of this shortfall we have embarked on a paramedic program and are looking seriously at other means by which we can optimally utilize our medical officers in clinical positions.

REIMBURSABLE OBLIGATIONS

Chairman ELLENDER. Please describe the reimbursable obligations found on page 1–3 of the justifications.

Admiral BAGLEY. Sir, these reimbursable obligations represent costs which will be incurred initially against the "Military personnel, Navy" appropriation with subsequent reimbursement from other funding sources. More specifically, Navy personnel assigned to other agencies on a reimbursable basis, and cash sales of meals and sales of bulk subsistence items are included.

SPECIAL PERSONAL SERVICE PAYMENTS

Senator YOUNG. On that page, to what does the entry "Special personal service payments" refer?

Admiral BAGLEY. Sir, the entry "Special personal service payments" refers to estimated payments for rewards and/or actual expenses paid to persons or agencies in connection with the apprehension of military deserters, absentees, and escaped military prisoners.

SUMMARY OF MILITARY PERSONNEL BY PRIMARY MISSION

Chairman ELLENDER. Please provide the committee with a tabulation of military personnel by primary mission.

Admiral BAGLEY. Yes, sir.

(The information follows:)

Type of support	Fiscal year 1973	Percent
Force mission (combat forces)—strategic, land, tactical air, Naval, and mobility forces	282,895	47
Other mission—intelligence, communications, research and development, support of other nations	36,634	6
Training—specialized, recruit, professional, other military training and United States Naval Academy	131,157	22
General support—base operating support, medical support, command, logistics and individual support	150,986	25
Total	601,672	100

ACTIVE DUTY MILITARY PERSONNEL MANPOWER BY BUDGET ACTIVITY

Chairman ELLENDER. At this point in the record there will appear the tabulation from the justifications showing the active duty military personnel manpower by budget activity.

ACTIVE DUTY MILITARY PERSONNEL MANPOWER BY FISCAL YEAR DIRECT PROGRAM AND BUDGET ACTIVITY

[Dollars in thousands; end strengths in whole numbers]

Budget activity/ operating program	Fiscal year— 1971 actual	1972 estimate	1973 estimate
DIRECT PROGRAM			
1. Strategic forces:			
Operation of the Navy:			
Costs	$134,466	$150,872	$155,344
End strengths:			
Officer	1,798	1,797	1,757
Enlisted	17,539	17,587	17,080
Total	19,337	19,384	18,837
2. General purpose forces:			
Operation of the Navy:			
Costs	$2,362,777	$2,609,034	$2,698,257
End strengths:			
Officer	31,611	30,765	29,799
Enlisted	308,145	304,853	298,338
Total	339,756	335,618	328,137
Operation of Defense agencies:			
Costs	$267	$320	----------
End strengths:			
Officer	14	16	----------
Enlisted	9	9	----------
Total	23	25	----------
Total, general purpose forces:			
Costs	$2,363,044	$2,609,354	$2,698,257
End strengths:			
Officer	31,625	30,781	29,799
Enlisted	308,154	304,862	298,338
Total	339,779	335,643	328,137
3. Intelligence and communications:			
Operation of the Navy:			
Costs	$212,399	$215,757	$217,636
End strengths:			
Officer	2,713	2,896	2,866
Enlisted	28,033	24,395	22,992
Total	30,746	27,291	25,858
Operation of Defense agencies:			
Costs	$18,668	$18,896	$19,105
End strengths:			
Officer	659	692	661
Enlisted	1,421	1,121	1,070
Total	2,080	1,813	1,731
Research and development, Defense agencies:			
Costs	$544	$605	$641
End strengths:			
Officer	23	23	23
Enlisted	32	34	34
Total	55	57	57
Total, intelligence and communications:			
Costs	$231,611	$235,258	$237,382
End strengths:			
Officer	3,395	3,611	3,550
Enlisted	29,486	25,550	24,096
Total	32,861	29,161	27,646

ACTIVE DUTY MILITARY PERSONNEL MANPOWER BY FISCAL YEAR DIRECT PROGRAM AND BUDGET ACTIVITY—Continued

[Dollars in thousands; end strengths in whole numbers]

Budget activity/ operating program	Fiscal year— 1971 actual	1972 estimate	1973 estimate
DIRECT PROGRAM—Continued			
4. Airlift and sealift:			
Operation of the Navy:			
Costs	$5,160	$5,584	$4,715
End strengths:			
Officer	197	206	177
Enlisted	356	309	232
Total	553	515	409
5. Guard and Reserve:			
Operation of the Navy:			
Costs	$116,469	$137,560	$147,746
End strengths:			
Officer	1,453	1,503	1,496
Enlisted	15,450	16,349	16,650
Total	16,903	17,852	18,146
6. Research and development:			
Research and development, Navy:			
Costs	$63,807	$70,154	$70,606
End strengths:			
Officer	1,405	1,429	1,346
Enlisted	6,956	6,803	6,495
Total	8,361	8,232	7,841
Research and development, Defense agencies:			
Costs	$224	$324	$343
End strengths:			
Officer	10	15	15
Enlisted	12	12	12
Total	22	27	27
Total, research and development:			
Costs	$64,031	$70,478	$70,949
End strengths:			
Officer	1,415	1,444	1,361
Enlisted	6,968	6,815	6,507
Total	8,383	8,259	7,868
7. Central supply and maintenance:			
Operation of the Navy:			
Costs	$101,446	$114,088	$114,866
End strenghts:			
Officer	3,858	4,172	3,875
Enlisted	7,023	6,782	6,663
Total	10,881	10,954	10,538
Operation of Defense agencies:			
Costs	$3,796	$4,902	$5,190
End strengths:			
Officer	243	296	296
Enlisted	19	21	21
Total	262	317	317
Research and development, Defense agencies:			
Costs	$15	$16	$17
End strengths:			
Officer	1	1	1
Enlisted	0	0	0
Total	1	1	1
Total, central supply and maintenance:			
Costs	$105,257	$119,006	$120,073
End strengths:			
Officer	4,102	4,469	4,172
Enlisted	7,042	6,803	6,684
Total	11,144	11,272	10,856

ACTIVE DUTY MILITARY PERSONNEL MANPOWER BY FISCAL YEAR DIRECT PROGRAM AND BUDGET ACTIVITY—Continued

[Dollars in thousands; end strengths in whole numbers]

Budget activity/ operating program	Fiscal year— 1971 actual	1972 estimate	1973 estimate
DIRECT PROGRAM—Continued			
8. Training, medical, and other general personnel activities:			
Operation of the Navy:			
Costs	$1,556,261	$1,604,240	$1,768,524
End strengths:			
Officer	25,368	24,351	24,895
Enlisted	149,998	135,403	145,444
Cadets	4,485	4,243	4,243
Total	179,851	163,997	174,582
9. Administration and associated activities:			
Operation of the Navy:			
Costs	$89,464	$92,714	$93,427
End strengths:			
Officer	3,800	3,305	3,234
Enlisted	5,221	5,728	5,229
Total	9,021	9,033	8,463
Operation of Defense agencies:			
Costs	$5,995	$6,357	$6,789
End strengths:			
Officer	326	333	333
Enlisted	173	145	153
Total	499	478	486
Research and development, Defense agencies:			
Costs	$355	$519	$550
End strengths:			
Officer	17	28	28
Enlisted	16	10	10
Total	33	38	38
Total, administration and associated activities:			
Costs	$95,814	$99,590	$100,766
End strengths:			
Officer	4,143	3,666	3,595
Enlisted	5,410	5,883	5,392
Total	9,553	9,549	8,987
10. Support of other nations:			
Operation of the Navy:			
Costs	$39,206	$50,669	$48,993
End strengths:			
Officer	969	1,367	1,169
Enlisted	3,344	3,957	3,797
Total	4,313	5,324	4,966
DIRECT PROGRAM SUMMARY			
Operation of the Navy:			
Costs	$4,617,648	$4,980,518	$5,249,508
End strengths:			
Officer	71,767	70,362	69,268
Enlisted	535,109	515,363	516,425
Cadets	4,485	4,243	4,243
Total	611,361	589,968	589,936
Operation of Defense agencies:			
Costs	$28,726	$30,475	$31,084
End strengths:			
Officer	1,242	1,337	1,290
Enlisted	1,622	1,296	1,244
Total	2,864	2,633	2,534

ACTIVE DUTY MILITARY PERSONNEL MANPOWER BY FISCAL YEAR DIRECT PROGRAM AND BUDGET ACTIVITY—Continued

[Dollars in thousands; end strengths in whole numbers]

Budget activity/operating program	Fiscal year— 1971 actual	1972 esti ate	1973 estimate
DIRECT PROGRAM—Continued			
Research and development, Navy:			
Costs	$63,807	$70,154	$70,606
End strengths:			
Officer	1,405	1,429	1,346
Enlisted	6,956	6,803	6,495
Total	8,361	8,232	7,841
Research and development, Defense agencies:			
Costs	$1,138	$1,464	$1,551
End strengths:			
Officer	51	67	67
Enlisted	60	56	65
Total	111	123	123
Total, direct program:			
Costs	$4,711,319	$5,082,611	$5,352,749
End strengths:			
Officer	74,465	73,195	71,971
Enlisted	543,747	523,518	524,220
Cadets	4,485	4,243	4,243
Total	622,697	600,956	600,434
Reimbursable program:			
Costs	$32,875	$36,000	$36,000
End strengths:			
Officer	92	229	227
Enlisted	234	1,011	1,011
Total	326	1,240	1,238
Total, Navy:			
Costs	$4,744,194	$5,118,611	$5,388,749
End strengths:			
Officer	74,557	73,424	72,198
Enlisted	543,981	524,529	525,231
Cadets	4,485	4,243	4,243
Total	623,023	602,196	601,672

STRATEGIC FORCES

Chairman ELLENDER. For fiscal year 1973 for "Strategic forces" the request is $155,344,000, as compared with an appropriation of $150,872,000 for fiscal year 1972. I note that the strength is decreased from 19,384 in fiscal year 1972 to 18,837 in the estimate for fiscal year 1973. I assume that the increase in the request is directly related to pay increases. Is that correct?

Admiral BAGLEY. Yes, sir. The pay raises accounted for approximately $10.7 million and was partially offset by strength decreases.

Senator YOUNG. Please describe what is included under the budget activity "Strategic forces."

Admiral BAGLEY. This activity provides military manpower for the Navy's strategic forces. Forty-one FBM submarines (SSBN's) represent the Navy's strategic offensive nuclear strike capability. Five submarine tenders provide repair support for deployed SSBN's. Logistics and engineering backup are needed to insure the operational reliability

of this weapons system as a credible nuclear deterrent. This is accomplished through the strategic systems projects office, plant representatives and ordance test facilities. Command and control is accomplished through C–130 aircraft squadrons and various communications facilities.

GENERAL PURPOSE FORCES

Chairman ELLENDER. For "General purpose forces" the fiscal year 1973 request is $2,698,257,000, an increase over the $2,609,354,000 for fiscal year 1972. Please describe this activity.

Admiral BAGLEY. These forces represent the bulk of the naval forces available to provide response over a wide range of contingencies. They consist of essentially all of the Active Fleet, less strategic forces, and the operating bases providing direct support to these units. General purpose forces include the following broad categories of commands: Unified commands—such as LANTCOM, PACOM, and so forth.

Aircraft forces, which include tactical air forces, ship and land-based ASW forces, and fleet and logistics support.

Ship forces, which include attack and ASW carriers—CVA and CVS respectively—escorts—DL, DD, DE, and so forth—amphibious forces—LCC, LST, LSD, LKA, and so forth—underway replenishment forces—AO, AE, AF and so forth—patrol craft, attack submarines, and mine countermeasures ships.

Fleet support, which includes certain fleet training activities, fleet staffs, and base operations, worldwide, to support ship and aircraft forces.

Special support forces, such as those serving with Marine Corps units.

Chairman ELLENDER. Military personnel assigned to this activity have been reduced from 335,643 in fiscal year 1972 to 328,137 in fiscal year 1973, but the cost is up. I wish you would indicate if there are any increases in this activity other than pay increases.

Admiral BAGLEY. No, sir; there are no other increases.

Senator YOUNG. I note that in fiscal year 1972, 25 officers and enlisted personnel were assigned to Defense agencies, but none are so assigned in fiscal year 1973 and no funds are requested for this. Please explain.

Admiral BAGLEY. The 25 personnel referred to were allocated to the Defense Communications Planning Group—a DCA activity. There are no numbers planned for fiscal year 1973 due to the disestablishment of this activity.

INTELLIGENCE AND COMMUNICATIONS

Chairman ELLENDER. For "Intelligence and communications" the fiscal year 1973 request is for $237,382,000 as compared with $235,258,000 for fiscal year 1972. Please describe this activity.

Admiral BAGLEY. Missions and activities directly related to combat forces, but not a part of any of the forces listed in strategic forces or general purpose forces, on which independent decisions can be made. Includes resources for primarily national or centrally directed Department of Defense objectives for intelligence and security; specialized missions such as weather service, aerospace rescue/recovery, and oceanography.

INTELLIGENCE AND COMMUNICATIONS

Chairman ELLENDER. We have already discussed this activity earlier in the hearing, but I wish to ask some additional questions. I note that the total number of military personnel has been decreased from 29,161 in fiscal year 1972 to 27,646 in fiscal year 1973. Please break this out by officers and enlisted personnel between intelligence and communications.

Admiral BAGLEY. Yes, sir.

(The information follows:)

	Fiscal year 1972	Fiscal year 1973
Intelligence	14,737	13,937
Officers	1,592	1,588
Enlisted	13,145	12,349
Communications	10,413	9,843
Officers	840	777
Enlisted	9,573	9,066
Other	4,011	3,866
Officers	1,179	1,185
Enlisted	2,832	2,681
Grand total, program III	29,161	27,646

Chairman ELLENDER. What is the principal reason for the increase over fiscal year 1972 in total costs?

Admiral BAGLEY. Sir, the increase is attributable to full year costs of the two pay increases, offset by indicated strength decreases.

Chairman ELLENDER. Indicate what the $19,105,000 will be used for in "Operation of defense agencies."

Admiral BAGLEY. Yes, sir. Under the direction of the Office of the Secretary of Defense, these billets are assigned to the Defense Intelligence Agency, the National Security Agency, the Defense Nuclear Agency, and the Defense Communications Agency to support the functions of these agencies.

Chairman ELLENDER. Also describe what the 57 personnel costing $641,000 will do in the activity "Research and Development, Defense agencies."

Admiral BAGLEY. There are 39 billets allocated to the Defense Nuclear Agency Test Command, Albuquerque, N. Mex., and site development directorate, Camp Mercury, Nev., for the purpose of nuclear weapons research and development. Eleven electronics engineers are allocated for the National Security Agency. There are, additionally, seven billets allocated to the Defense Communications Agency for their systems engineering facility.

AIRLIFT AND SEALIFT

Chairman ELLENDER. For "Airlift and sealift" the fiscal year 1973 request is $4,715,000, a reduction from the $5,584,000 appropriated in fiscal year 1972. Military personnel assigned to this activity have dropped from the 515 in fiscal year 1972 to 409 in 1973. Please indicate how that will be accomplished.

Admiral BAGLEY. The declining areas associated with this program from fiscal year 1972 to fiscal year 1973 involve the transportation

units—minus 34—and the downward phasing of Military Sealift Command Office, Vietnam—minus 72.

Senator YOUNG. I wish you would describe this activity.

Admiral BAGLEY. The approximately 500 military manpower spaces in the program are utilized in the management area of an essentially civilian program. They are located mostly at the various Military Sealift Command Field Headquarters for port terminal operations and traffic management analysis.

GUARD AND RESERVE

Chairman ELLENDER. For "Guard and reserve" the fiscal year 1973 request is $147,746,000. This is an increase over the fiscal year 1972 appropriation of $137,560,000. The number of military personnel in this activity has also increased: the number so assigned in fiscal year 1972 was 17,852, of which 1,503 were officers. For fiscal year 1973 the request contemplates 18,146 of which 1,496 would be officers. Please indicate the reason for this increase.

Admiral BAGLEY. This increase is due to the requirement for a higher nucleus crew manning level in the more modern FRAM I—Fleet Rehabilitation and Modernization—and FRAM II destroyers which are being transferred to the Reserve program and will replace the older non-FRAM destroyers.

Senator YOUNG. Also, I wish you would describe specifically the function of these personnel.

Admiral BAGLEY. These active-duty personnel are engaged full time in the training and administration of the Naval Reserve, and are assigned under the functions of command; field headquarters, training, and administrative support; instructors and support personnel; combat unit mission support; and manpower center and personnel records. Approximately 81 percent of the active duty total perform combat unit mission support and constitute the hard core of skilled personnel to operate and maintain the more sophisticated equipment currently assigned and being gained by the Naval Reserve air and surface units. The Naval Reserve combatant-type ships—destroyers/minesweepers—and coastal/river craft add to the Navy's immediate response capability over a range of mission areas, as well as serve their primary mission of training the reservists. Also, under the combat unit mission support function are active duty personnel assigned directly to the 45 Naval Air Reserve Force squadrons which comprise the two Reserve attack air wings, two Reserve antisubmarine warfare groups, 12 (VP) patrol squadrons, and three (VR) transport squadrons of the Naval Air Reserve Force designed to be immediately responsive to the needs of the fleet. These personnel form the nucleus of trained and experienced personnel of their respective squadrons, and provide the continuity of the maintenance effort.

RESEARCH AND DEVELOPMENT

Chairman ELLENDER. For "Research and development" for fiscal year 1973 the request is for $70,949,000, a slight increase over the $70,478,000 provided for fiscal year 1972. Military personnel engaged in the activity total 7,868 for fiscal year 1973, somewhat lower than

the 8,259 so engaged in fiscal year 1972. Is any part of the increase for activities other than the pay raise?

Admiral BAGLEY. No, sir.

Senator YOUNG. Describe this activity generally.

Admiral BAGLEY. Yes, sir. This activity provides support for all phases of research and development. This includes research, exploratory development, advance development, engineering development, management and support.

Senator ELLENDER. Within this activity I note that 27 military personnel will, in fiscal year 1973, be associated with "Research and Development, Defense Agencies" activities. Please explain their functions.

Admiral BAGLEY. The 27 Navy personnel billets—15 officers/12 enlisted—are authorized for the Air Force Radiobiology Research Institute (AFRRI), Defense Nuclear Agency (DNA). AFRRI is a joint service research institute the mission of which is to conduct scientific research in the field of radiobiology and related matters that are essential to the medical support of the Department of Defense (DOD). Scientific research programs conducted by AFRRI encompass a variety of biomedical problems associated with nuclear weapon's effects. Navy personnel assigned to AFRRI perform research and/or research-support functions. Officer personnel perform duties in the following functional areas: Medical research, industrial hygiene, radiophysics, radiobiology, radiological health, biophysics, radiation health, and biochemistry.

Enlisted personnel perform duties in the following functional areas: Radiological safety procedures, nuclear powerplant operation, laboratory analysis, logistics, electronics/technical equipment repair, and general administration.

CENTRAL SUPPLY AND MAINTENANCE

Senator ELLENDER. For "Central supply and maintenance" for fiscal year 1973 the request is $120,073,000. The amount provided for fiscal year 1972 was $119,006,000. I note a reduction in personnel to 10,856 from 11,272 in fiscal year 1972. Please indicate the general nature of this activity.

Admiral BAGLEY. Yes, sir. This activity provides the logistic support required by the operating forces which is assigned, depending on its nature, to one of the six Systems Commands—Naval Ordnance, Naval Air, Naval Supply, Naval Ships, Naval Electronics, Naval Facilities Engineering—for central management. Examples are: rework of missiles and overhaul of Naval and Marine Corps aircraft, rework of air and ship ordnance, the operation of Navy's supply system and engineering and technical support. This support is provided through supply depots and stations, Naval aviation rework facilities, Naval shipyards and ammunition and ordnance depots and weapons stations.

Senator YOUNG. Within this activity you indicate that 317 military personnel costing $5,190,000 will be engaged in "Operation of defense agencies" activities. Please explain.

Admiral BAGLEY. The military personnel engaged in "Operation of defense agencies" in program VII are assigned to the Defense Supply Agency and the associated field activities. The assignments are in

keeping with requirements levied on Navy by the Department of Defense to provide personnel support for approved programs. Examples of activities involved with these allocations are the Defense Construction Supply Center, the Defense Electronics Supply Center, the Defense Fuel Supply Center, and the Defense Industrial Supply Center, as well as DSA Inspector General field offices, defense depots and Defense regional and administration offices.

Senator YOUNG. Also, one officer will be assigned to "Research and Development, Defense Agencies." What is his function?

Admiral BAGLEY. This officer is assigned to the Defense Documentation Center, Defense Supply Agency, Cameron Station, Va., as the only naval officer in an organization of 500 people. The Defense Documentation Center provides scientific, technical, and management information services to the research, development, test, and evaluation program throughout the Department of Defense. This officer assists in the formulation and implementation of DOD directives and instructions pertaining to the scientific and technical information programs. He maintains liaison with organizations and individuals within the Government and industries that use these services by identifying recurring problems, conducting studies, and recommending improvements and corrective changes in the system.

TRAINING, MEDICAL, AND OTHER GENERAL PERSONNEL ACTIVITIES

Chairman ELLENDER. For "Training, medical, and other general personnel activities" the fiscal year 1973 request is $1,768,524,000, involving 174,582 military personnel, including 4,243 cadets or midshipmen. This is a decided increase over the $1,604,240,000 provided for fiscal year 1972 and involving 163,997 personnel. Please justify both the increase in funds requested and the increase in the number of personnel to support this activity.

Admiral BAGLEY Sir., the increase from fiscal year 1972 to fiscal year 1973 associated with this program reflects many of the new personnel programs initiated to upgrade the standard of service life and its desire to be more responsive to the individual. Also reflected is the directed program of striving for an all-volunteer force—about +1,770—which includes inter alia recruiters and manpower spaces associated with the associate degree completion program. A large increase from fiscal year 1972 to fiscal year 1973 is in support of higher recruit training requirements—about +6,560—and increased requirements for student specialized training billets—about +385—including the Chief Petty Officer Academy, and the Defense Language Institute. The flight training requirements decreased in relation to present projected flight training requirements—by about −1,000—medical manpower requirements increased—approximately +2,700—in support of the revised program to be more responsive to the medical needs of the service personnel and their dependents. Also included is the drug rehabilitation program.

Senator YOUNG. I notice that the 4,243 cadets or midshipmen budgeted for fiscal years 1973 and 1972 is lower than the number of 4,485 in fiscal year 1971. Please explain.

Admiral BAGLEY. Yes, sir; the end strength for fiscal year 1971 at the Naval Academy was high due to fewer than normal attrition losses

in the last months of the fiscal year coupled with a carryover of about 25 midshipmen into fiscal year 1972 for credit makeup before commissioning. Heavy attrition losses in early fiscal year 1972 have more than compensated for the overage at end fiscal year 1971.

Chairman ELLENDER. Proceed.

ADMINISTRATION AND ASSOCIATED ACTIVITIES

Chairman ELLENDER. For "Administration and associated activities" the fiscal year 1973 request is $100,766,000 as compared with the $99,590,000 provided for fiscal year 1972. Describe this activity, please.

Admiral BAGLEY. This program provides manpower resources for the staff of the Secretary of the Navy and the Chief of Naval Operations. It also includes manpower for other major headquarters such as the Bureau of Naval Personnel, Bureau of Medicine and Surgery, and the Chief of Naval Material. Field activities within this program include those Navy staff offices which perform Navy-wide internal auditing, accounting, and disbursing services. Other activities include headquarters for the naval district commandants; and activities having support, specialized or technical type missions such as manpower survey and operational study groups. In addition, the military manpower associated with the Navy exchange system is included within this program.

Chairman ELLENDER. The justifications indicate that military personnel in this activity associated with "Operation of the Navy" will decrease from 9,033 in fiscal year 1972 to 8,463 in 1973, but that the number utilized in "Operation of Defense agencies" will increase and the number utilized in "Research and Development, Defense Agencies" remains constant. Why is it that there should be a reduction in military personnel for Navy operations yet the number assigned outside the Department be increased or remain constant?

Admiral BAGLEY. The decrease in military personnel for Navy operations results from decisions made during the Office of Secretary of Defense review of this budget. The increase in operation of Defense agencies are to support the functions of these agencies.

Senator YOUNG. Does the Department of the Navy have any authority to assign more or fewer personnel to Department of Defense activities?

Admiral BAGLEY. No, sir. The Navy is required to man the activities consistent with specific requirements validated by the Joint Chiefs of Staff and/or the Office of the Secretary of Defense.

SUPPORT OF OTHER NATIONS

Chairman ELLENDER. For "Support of other nations" the fiscal year 1973 request is for $48,993,000 as compared with $50,669,000 for fiscal year 1972. The number of personnel so engaged also shows a decrease, from 5,324 to 4,966. Please describe this activity.

Admiral BAGLEY. This activity provides military manpower to support International Military Headquarters and Agencies, Military Assistance Advisory Groups, and Missions and Military Assistance Groups for which the Department of the Navy is the executive agent.

DISTRIBUTION OF MILITARY PERSONNEL BY GEOGRAPHIC AREA

Chairman ELLENDER. At this point there will appear a tabulation from the justifications indicating the distribution of military personnel by geographic area.

(The information follows:)

DISTRIBUTION OF MILITARY PERSONNEL BY GEOGRAPHICAL AREAS[1]

Region and country	Number of personnel (end strengths)		
	Fiscal year 1971	Fiscal year 1972	Fiscal year 1973
Europe and related areas:			
Afloat	27,739	26,967	28,035
Other Europe and related areas	14,449	13,462	14,011
Total Europe and related areas	42,188	40,429	42,046
Western Pacific:			
Japan	6,717	4,598	4,582
Afloat	32,500	30,500	28,400
Other Western Pacific	10,212	8,251	8,133
Total Western Pacific	49,429	43,349	41,115
Near East and South Asia	372	479	477
Other Pacific	570	521	521
Western Hemisphere	2,129	1,975	2,133
U.S.S.R. and East Europe	9	8	8
United States, territories and SEA:			
Conus	263,076	257,865	262,701
Hawaii	10,494	11,779	11,536
Guam	4,405	4,842	4,704
Afloat	184,327	187,592	186,864
Other United States, territories and SEA	66,024	53,357	49,567
Total United States, territories and SEA	528,326	515,435	515,372
Total	623,023	602,196	601,672

[1] Number of personnel distributed by region, and by country if the end strength for a country exceeds 5,000.

PERSONNEL IN EUROPE

Chairman ELLENDER. In the table on page 1–18 of the justifications it is indicated that personnel in Europe and related areas will increase from 40,429 to 42,046 between 1972 and 1973. Justify this increase.

Admiral BAGLEY. Mr. Chairman, military personnel requirements for the [deleted] were inadvertently omitted from those totals and should be included. Therefore, fiscal year 1972 should be increased by 395 and fiscal year 1973 should be increased by 418 to revised totals to 40,824 for fiscal year 1972 and 42,464 for fiscal year 1973. The net increase is 1,640.

The increase of 1,640 is attributable to several causes, the primary factor being the increase in the Navy's readiness posture [deleted].

SCHEDULE OF INCREASES AND DECREASES

Chairman ELLENDER. At this point in the record there will appear the schedule of increases and decreases in the fiscal year 1973 program as it appears in the justifications.

(The information follows:)

Schedule of increases and decreases

[In thousands of dollars]

	Amount
Pay and allowances of officers:	
Fiscal year 1972 program	1,177,036
Increases:	
Basic pay, basic allowance for quarters, lump sum leave payments, Reserve readjustment payments, severance pay for physical disability and FICA due primarily to full-year implementation of pay increases	+47,904
Aviation pay, flight deck pay, special pay for physicians and dentists, continuation pay for submarine officers and optometrists pay due to planned increase in entitlements	+2,963
Total increases	+50,867
Decreases:	
Basic allowance for subsistence related to man-year reduction	−431
Hostile fire payments and family separation payments due to reduced overseas deployment	−987
Clothing allowance, submarine duty pay, station allowances overseas, and separation payments on failure of promotion based on fewer planned entitlements	−1,138
Total decreases	−2,556
Fiscal year 1973 program	1,225,347
Pay and allowances of enlisted:	
Fiscal year 1972 program	3,360,872
Increases:	
Basic pay, basic allowance for quarters and FICA due to the full-year implementation of the pay increases	+224,270
Separation payments due to full year of pay increases and increased number of planned losses	+11,568
Reenlistment bonus due to full year of pay increases and increased number of planned reenlistments	+6,331
Clothing allowances due to higher number of recruits	+4,497
Total increases	+246,666
Decreases:	
In hostile fire pay, family separation payments and duty at certain places pay due to reduced overseas deployment	−11,286
Fewer entitlements for incentive pay, proficiency pay and station allowances overseas	−2,105
Total decreases	−13,391
Fiscal year 1973 program	3,594,147
Pay and allowance of cadets:	
Fiscal year 1972 program	15,843
Increase: Basic pay and FICA increase due to full-year implementation of pay increases	+962
Decrease: Full-year implementation of reduction in commuted ration rate	−36
Fiscal year 1973 program	16,769

Schedule of increases and decreases—Continued

[In thousands of dollars]

Subsistence of enlisted personnel:	
Fiscal year 1972 program	292,194
Increase: Additional allowance for improved food items	+2,478
Decreases:	
Commuted ration rate	−3,790
Change in afloat ration rate	−7,881
Fewer cash subsistence allowances and reduction in general messes directly related to man-year strength reduction, decrease in planned survey/spoilage, and reduction of 1 day from fiscal year 1972 to fiscal year 1973	−4,706
Total decreases	−16,377
Fiscal year 1973 program	278,295
Permanent change of station travel:	
Fiscal year 1972 program	263,920
Increases:	
Number of enlisted and midshipmen accession moves, enlisted training moves, enlisted separation moves, and organized unit moves for officers and enlisted	+14,307
Changes due to currency revaluation, mileage allowance, port handling charges, trucking rates, MAC cargo rates, and dislocation allowances	+4,656
Total increases	+18,963
Decreases:	
Fewer moves in areas of officer accession and training, operational and rotational, both officer and enlisted, and officer and midshipmen separation programs	−14,017
Decrease in MAC passenger rates, and reduction for per diem	−2,857
Total decreases	−16,874
Fiscal year 1973 program	266,009
Other military personnel costs:	
Fiscal year 1972 program	8,746
Increases:	
Interest on uniformed services savings deposits for officers, because of exclusion of prisoners of war from $10,000 limitation	+78
Death gratuities due to full-year implementation of pay increases	+43
Total increases	+121
Decrease: Premium reduction from 8 percent to 5 percent for Government contribution to SGLI program	−685
Fiscal year 1973 program	8,182

GAINS AND LOSSES

Chairman ELLENDER. Also at this point in the record there will appear a tabulation from the justifications showing "Gains and losses by type of officer, enlisted and midshipmen."

(The information follows:)

GAINS AND LOSSES BY TYPE FOR OFFICER, ENLISTED, AND MIDSHIPMEN

	Fiscal year—		
	1971	1972	1973
OFFICERS			
Beginning strength	80,536	74,557	73,424
Gains:			
Naval Academy	737	813	750
Officer candicate school	3,013	3,217	2,903
College training programs	2,385	2,680	2,045
Staff corps procurement	2,451	3,262	3,533
Volume recall to active duty	573	288	390
Warrange officers from enlisted	288	945	0
Gain adjustments	76	107	0
Total gains	9,523	11,312	9,621
Losses:			
Medical doctor losses	1,426	1,151	1,110
Resignation	1,248	1,141	1,094
Early release	2,978	3,290	400
Normal release	4,127	3,797	4,555
Promotion passovers	425	401	389
Revert to enlisted	244	98	98
Retirement (over 20 years service)	4,376	1,808	2,751
Normal attrition	450	450	450
Loss adjustments	228	309	0
Total losses	15,502	12,445	10,847
End year strength	74,557	73,424	72,198
ENLISTED			
Beginning strength	607,433	543,981	524,529
Gains:			
Officer candidates	3,687	3,899	3,783
Chargeable (USN) recruits	75,156	92,872	131,586
Waves	2,453	2,194	2,422
Filipinos	420	480	540
Nonchargeable	4,535	5,402	4,456
USNR (2X6)	21,378	16,885	12,744
USNR miscellaneous	3,892	4,090	3,194
Returned deserters	6,063	5,041	5,043
Total gains	117,584	130,863	163,768
Losses:			
Officer candidates	3,538	4,199	3,838
Separation at expiration of term of service or early release	161,403	131,174	145,166
Retirements	9,767	9,633	8,752
Deserters	6,328	5,309	5,310
Total losses	181,036	150,315	163,066
End year strength	543,981	524,529	525,231
MIDSHIPMEN			
Beginning strength	4,466	4,485	4,243
Gains: Input	1,275	1,236	1,351
Losses:			
Graduates	875	938	872
Attrition	381	540	479
Total losses	1,256	1,478	1,351
End year strength	4,485	4,243	4,243
Grand total—end strength	623,023	602,196	601,672

OFFICER GAINS

Chairman ELLENDER. The tabulation provided for the record on "Gains and losses" indicates a substantial number of officers—3,533—secured by means of "Staff Corps procurements." Please describe this.

Admiral BAGLEY. Yes, sir. Staff Corps procurement includes planned officer gains in the Medical, Dental, Medical Service, Judge Advocate General, Nurse, Chaplain, Supply, and Civil Engineer Corps, and associated student programs.

Senator YOUNG. I note that you plan to secure 390 officers through the process of voluntary recall to active duty. Describe this procedure and indicate why it is necessary to procure officers in this fashion.

Admiral BAGLEY. Reserve officers on inactive duty who desire voluntary extended active duty submit applications which are reviewed by a board of officers appointed for that purpose. In addition to the existing needs aspect, basic criteria for selection are age, education, previous naval and civilian experience, past performance, assignability, and so forth. The advantage of procuring officers through voluntary recall is that these are trained and experienced naval officers and can be utilized almost immediately in areas where their individual qualifications are most needed.

Senator YOUNG. Indicate the number of such recalls generally by grade.

Admiral BAGLEY. Mr. Chairman, in fiscal year 1973 we estimate that we will gain three lieutenant commanders, 337 lieutenants, and 50 ensigns who are graduates of the Merchant Marine Academy and are reserve officers. Total, 390.

MEDICAL OFFICER LOSSES

Chairman ELLENDER. The tabulation shows that you anticipate losing 1,110 medical doctors in fiscal year 1973. What is the total number of doctors required by the Navy?

Admiral BAGLEY. The latest officer requirements plan dated February 11, 1972, shows a requirement of 4,425 medical doctors.

Chairman ELLENDER. Describe how you secure medical personnel.

Admiral BAGLEY. Yes, sir. The majority of doctors are procured through the Armed Forces Physicians' Appointment and Residency Consideration program—the so-called Berry plan—which is administered by the Department of Defense for all services. Senior medical students make application for the program and indicate a preference to enter on active duty at one of three possible times:

(1) Within the period immediately following his internship;

(2) Subsequent to a 1-year delay following internship; or

(3) Following completion of a residency training program—1-, 2- or 3-year programs.

Applicants indicate their service preference and when choosing a residency, the specialty desired. The applicant is commissioned inactive and later brought on active duty for 2 years' service after completion of one of the options above. Since 1965, the Navy has obtained about 1,000 physicians annually under this plan.

From time to time, the doctor draft is used to procure doctors not obtained from other sources. In fiscal year 1972, 384 physicians have

been obtained via this source with a total of 427 expected by June 30, 1972.

The Navy has a senior medical student program for students in their senior year of medical school. Participants in this program receive active duty pay and allowances as either an O–1, O–2, or O–3 for the period they continue under instruction in medical school. Tuition and other school expenses must be borne by the individual. Graduates of this program are commissioned as lieutenants and are required to serve on active duty for 3 years. The Navy gets between 100 and 200 doctors annually from this source.

In fiscal year 1971, the Navy started a full medical scholarship program with an initial input of 100 students. There will be no graduates of this program until fiscal year 1973. Students selected for this program receive full pay and allowances of an officer in pay grades O–1, O–2, or O–3 plus tuition, textbook, and lab fees. Graduates of the program are obligated to serve 5 years on active duty.

Each year a limited number of physicians volunteer for service in the Medical Corps and are commissioned in a rank commensurate with their experience in civilian life and the degree of their specialization. The number procured via this direct appointment program averages about 100 per year.

Finally, about 20 to 30 physicians who have had prior active service are recalled to active duty each year. Generally these officers have maintained Inactive Reserve status and choose to come on active duty for short periods of time—usually a year or two. A few choose to make the Navy a career.

Senator YOUNG. What is the situation in regard to the adequacy in the number of medical doctors?

Admiral BAGLEY. The Navy is currently able to procure an adequate number of medical doctors from both the draft and Berry plan program. However, in a zero-draft climate and without the doctor draft in fiscal year 1973, recruiting for doctors will reach a grave situation. Medical Corps strength excluding the draft, with and without the Berry plan, are as follows:

	Fiscal year—				
	1973	1974	1975	1976	1977
With Berry plan:					
Authorized billets	4,425	4,525	4,525	4,525	4,525
Beginning strength	4,266	4,208	4,006	3,717	3,621
Loss	1,125	1,148	1,067	946	778
	3,141	3,060	2,939	2,771	2,843
Gains	1,067	946	778	850	548
End strength	4,208	4,006	3,717	3,621	3,391
Shortfall	217	519	808	904	1,134
Without Berry plan:					
Authorized billets	4,425	4,525	4,525	4,525	4,525
Beginning strength	4,266	3,478	2,726	2,828	2,982
Loss	1,125	1,148	337	396	439
	3,141	2,330	2,389	2,432	2,543
Gains	337	396	439	550	385
End strength	3,478	2,726	2,828	2,982	2,928
Shortfall	947	1,799	1,697	1,543	1,597
Total	730	1,280	889	639	463

Senator YOUNG. Are you able to maintain a sufficient number of medical doctors with both medical and naval experience?

Admiral BAGLEY. No, sir. A medical doctor in the grade of commander is considered to be experienced to a high degree in his medical profession as well as being an experienced naval officer. Retention of doctors in the grades of lieutenant and lieutenant commander is poor since most of them complete their obligated service then accept positions with the civilian community that command higher salaries. The following chart shows a shortage of experienced commanders which concomitantly produces shortages in the various medical specialties.

REQUIREMENTS VERSUS INVENTORY FOR FISCAL YEAR 1973

	Fiscal year 1973 requirements	Inventory [1]	Manning level
Flag	18	15	83.3
Captain	370	416	112.4
Commander	458	404	88.2
Lieutenant Commander	1,240	1,520	122.6
Lieutenant	2,339	2,168	92.7
Total	4,425	4,523	102.2

[1] As of Dec. 31, 1971.

PRIOR RELEASE OF OFFICERS

Chairman ELLENDER. You estimate that there will be 400 officers released before the conclusion of their contracts. Please explain.

Admiral BAGLEY. In the process of developing the fiscal year 1973 strength constraints it became apparent that officer man-years would have to be reduced to live within the planned funding. Therefore, during the formulation of the strength plan, every effort was directed toward absorbing these reductions through reducing and rephasing procurement. Procurement quotas were reduced to the minimum level required to sustain the future officer corps. Even so, it was still necessary to plan for the release of 400 officers varying months prior to the expiration of their obligated service to fully accomplish the 750 man-year strength reduction dictated by fiscal constraints.

Chairman ELLENDER. Describe the situation that takes place under the item "Revert to enlisted."

Admiral BAGLEY. Temporary officers—the vast majority of which are warrant and limited duty officers—also hold permanent enlisted status and are promoted in that status as long as they remain temporary officers. Simply put, when a temporary officer reverts to enlisted, he resigns the temporary appointment and goes back to his former enlisted status in the pay grade to which he has been most recently promoted while serving as a temporary officer. While most reversions are voluntary, it would be legal to revert all temporary officers to enlisted involuntarily, where necessitated by officer strength requirements.

ENLISTED GAINS

Chairman ELLENDER. Under "Enlisted gains" I note the anticipated accession of 2,442 Waves, an increase over the 2,194 estimated for fiscal year 1972. What is the reason for the increase?

Admiral BAGLEY. Wave input has historically varied very little from year to year. However, in order to effect the transfer of Wave recruit training facilities from Bainbridge, Md. to Orlando, Fla., it was necessary to reduce WAVE input in the last 2 months of fiscal year 1972. This is a one-time situation and the planned fiscal year 1973 Wave gains represent a return to normal input, rather than a real increase.

Senator YOUNG. Are you able to secure an adequate number of Wave personnel?

Admiral BAGLEY. Yes, sir.

Senator YOUNG. The justifications indicate that the accession of 540 Filipinos is contemplated. Please describe their functions.

Admiral BAGLEY. The 540 Filipinos whom we plan to recruit will perform the same sort of functions as other recruits with one exception: because they are foreign nationals, they will not be permitted to enter those ratings which require a security clearance in the performance of duty.

Chairman ELLENDER. What is the item "Nonchargeable" which indicates gains of 4,456?

Admiral BAGLEY. Mr. Chairman, the 4,456 "Nonchargeable" gains include broken and continuous service reenlistees, USNR personnel enlisting USN, and other smaller miscellaneous inputs.

Chairman ELLENDER. Describe "USNR (2X6)" which indicates gains of 12,744.

Admiral BAGLEY. "USNR (2X6)" gains are personnel who sign contracts for a 6-year military obligation, two of which must be served on active duty and four of which must be served in the reserves.

Senator YOUNG. One of your gains is "Returned deserters" for which the estimate indicates that 5,043 are anticipated. Describe this item generally and indicate the status of such personnel.

Admiral BAGLEY. A "deserter" is a man who is absent from his assigned duty station for more than 30 days. Since a man in a "deserter" status is nonproductive, he is dropped from active duty rolls at the time at which he is declared a "deserter." He is counted as a gain when he returns.

ENLISTED LOSSES

Chairman ELLENDER. One of the "Enlisted losses" is "Deserters." It is indicated that you anticipate the loss of 5,310 enlisted personnel as a result of this. Roughly, this seems to be more or less comparable to the number who will return. Please explain.

Admiral BAGLEY. Sir, as is indicated by the number of "deserters" and "returned deserters" planned for fiscal year 1973, about 95 percent of those men who desert from the Navy are either apprehended or voluntarily return during the fiscal year.

RETENTION OF OFFICERS

Chairman ELLENDER. Please provide a tabulation showing retention by type of accession.

Admiral BAGLEY. Fiscal year 1971 officer retention rates for the three major warfare specialty communities—pilot, surface, and nuclear submarine—at minimum service plus 2 years by major source programs are:

[Combined retention rate]

Source:	Percent
U.S. Naval Academy	50
NROTC (regular)	24
NROTC (contract)	11
Officer Candidate School	9
Reserve Officer Candidate	19
Aviation Officer Candidate	15
Naval Aviation Cadets	26
Navy Enlisted Scientific Educational Program	46

SUMMARY OF REQUIREMENTS BY BUDGET PROGRAM

Chairman ELLENDER. There will also appear in the record a summary of requirements by budget program.

(The information follows:)

PERSONNEL SUMMARY (IN THOUSANDS OF DOLLARS)

	Fiscal year—		
	1971 actual	1972 estimate	1973 estimate
Direct program:			
1. Pay and allowances of officers	1,123,228	1,173,195	1,221,426
2. Pay and allowances of enlisted	3,029,531	3,354,186	3,587,541
3. Pay and allowances of cadets	14,314	15,843	16,769
4. Subsistence of enlisted personnel	281,808	272,801	258,902
5. Permanent change of station travel	240,672	257,840	259,929
6. Other military personnel costs	21,766	8,746	8,182
Total direct program	4,711,319	5,082,611	5,352,749
Reimbursable program:			
1. Pay and allowances of officers	1,723	3,841	3,921
2. Pay and allowances of enlisted	2,382	6,686	6,606
4. Subsistence of enlisted personnel	28,670	19,393	19,393
5. Permanent change of station travel	100	6,080	6,080
Total reimbursable program	32,875	36,000	36,000
Total obligations	4,744,194	5,118,611	5,388,749

SUMMARY OF MILITARY PERSONNEL STRENGTH

Chairman ELLENDER. Also a summary of military personnel strength will appear in the record at this point.

(The information follows:)

SUMMARY OF MILITARY PERSONNEL STRENGTH

	Fiscal year 1971 actual		Fiscal year 1972 planned		Fiscal year 1973 planned	
	Man-years	End strength June 30, 1971	Man-years	End strength June 30, 1972	Man-years	End strength June 30, 1973
Direct program:						
Officers	77,126	74,465	73,332	73,195	72,584	71,971
Enlisted	573,635	543,747	528,561	512,518	523,119	524,220
Academy Cadets	4,315	4,485	4,251	4,243	4,243	4,243
Total direct program	655,076	622,697	606,144	600,956	599,946	600,434
Reimbursable program:[1]						
Officers	91	92	229	229	227	227
Enlisted	232	234	1,011	1,011	1,011	1,011
Total reimbursable program	323	326	1,240	1,240	1,238	1,238
Total program:						
Officers	77,217	74,557	73,561	73,424	72,811	72,198
Enlisted	573,856	543,981	529,572	514,529	524,130	524,231
Academy cadets	4,315	4,485	4,251	4,243	4,243	4,243
Total program	655,399	623,023	607,384	602,196	601,184	601,672

[1] Military personnel assigned to agencies outside of Department of Defense on a reimbursable basis under the provisions of 10 USC 5416.

PAY AND ALLOWANCES OF OFFICERS

Chairman ELLENDER. Also at this point in the record there will appear the tabulation "Pay and allowances of officers" from the justifications.

(The information follows:)

BUDGET ACTIVITY 1: PAY AND ALLOWANCES OF OFFICERS—SUMMARY OF OBLIGATIONS

[In thousands of dollars]

Budget project title	1971 actual	1972 estimate	1973 estimate
Basic pay	849,230	884,213	912,985
Incentive pay for hazardous duty	54,620	54,109	54,726
Special pay	24,684	24,734	26,320
Basic allowances for quarters	83,492	105,387	119,148
Basic allowances for subsistence	44,366	42,265	41,834
Station allowances overseas	3,456	3,135	2,883
Uniform allowances	1,828	2,410	2,061
Family separation allowance	3,484	2,775	2,481
Separation payments	29,417	27,002	27,686
Social security tax—employer's contribution	30,374	31,006	35,223
Total obligations	1,124,951	1,177,036	1,225,347
Reimbursable obligations	−1,723	−3,841	−3,921
Total direct obligations	1,123,228	1,173,195	1,221,426

BASIC PAY

Chairman ELLENDER. For "Basic pay" of officers the fiscal year 1973 request is $912,985,000, an increase over the $884,213,000 provided in fiscal year 1972. Please indicate the nature of this increase.

Admiral BAGLEY. Sir, the increase is primarily due to the full year implementation of the November 14, 1971, and January 1, 1972, pay increases, partially offset by a relatively small decrease in planned man-years.

Chairman ELLENDER. For fiscal year 1971, the justifications indicated there were 77,217 officers; for 1972, 73,561; and for 1973, 72,811, yet in one of the upper grades, rear admiral, lower half, the number has increased slightly. Why is that?

Admiral BAGLEY. Navy requirements for flag officers, which are determined by continual explicit review, have exceeded and currently exceed both the number allowed by the strength related, sliding scale tables of the Officer Grade Limitation Act 1954 and the lesser number allowed by the Senate by its confirming power.

In that context, we are having to assign more rear admirals, lower half, to positions requiring and formerly filled by more senior flag officers.

INCENTIVE PAY FOR HAZARDOUS DUTY

Chairman ELLENDER. For "Incentive pay for hazardous duty" the fiscal year 1973 request is $54,726,000. This is a very slight increase over the amount provided for fiscal year 1972 of $54,109,000. Please indicate the various occupations for which hazardous duty pay is received.

Admiral BAGLEY. The categories of hazardous duty pay are:

(1) Duty involving frequent and regular participation in aerial flight as a crew or noncrew member.

(2) Duty on board a submarine.

(3) Duty involving parachute jumping.

(4) Duty in high- or low-pressure chambers and as experimental subjects in acceleration, deceleration, and thermal stress experiments.

(5) Duty or training involving demolition of explosives as a primary part of duties.

(6) Duty as member of flight-deck crew of an aircraft carrier.

Senator YOUNG. Of the 157 noncrew members receiving flying duty pay, how many are above the rank of commander?

Admiral BAGLEY. As of the latest count, there were 26 commanders and above receiving noncrew member flying duty pay.

SPECIAL PAY

Chairman ELLENDER. For "Special pay" for officers the fiscal year 1973 request is $26,320,000, an increase over the $24,734,000 provided for fiscal year 1972. Describe "Special pay."

Admiral BAGLEY. Sir, a brief explanation for each item budgeted is as follows:

(*a*) *Physicians and dentists.*—Based on numbers to provide medical/dental service to Marine Corps and Navy personnel. Payment

varies from $100 per month to $350 per month depending on the length of active service as a physician or dentist.

(*b*) *Responsibility pay.*—This is based on the approved number of Naval adviser billets for personnel serving in Vietnam.

(*c*) *Flag officers.*—Personal money allowance. This item is the planned average number of vice admirals and above on active duty. The allowance is for the officers' personal use as a partial compensation commensurate with his rank.

(*d*) *Diving duty.*—This item is based on the number of billets required for those engaged in deep sea, salvage, and demolition diving duty. Statutory rate is $110 per month.

(*e*) *Special pay.*—This is for payment for members in hostile fire area. It is based on those personnel planned to be in the area of entitlement. Rate is statutory for all at $65 per month.

(*f*) *Special allowances.*—Public Law 37 U.S.C. 414(b) provides these allowances to be paid to officers serving in the following capacities:

Director of Naval Intelligence	$5,200
Superintendent of the Naval Academy	5,200
President of the Naval War College	1,000
Commandant of Midshipment at the Naval Academy	800
Superintendent of the Naval War College	400

(*g*) *Continuation pay—physicians.*—This is based on those eligible doctors who are serving in a critical shortage specialty category. Maximum payment of 4 months basic pay per year of extended service.

(*h*) *Continuation pay—submarine officers.*—This item provides maximum payment of $3,750 per year for those junior nuclear trained submarine officers who have served their minimum obligated service and volunteer to remain on active duty for 4 additional years.

(*i*) *Optometrist pay.*—Based upon the planned average number of registered optometrists serving in the Navy, Statutory rate is $100 per month. This item was approved for payment with the November 14, 1971, pay bill.

Chairman ELLENDER. What is the reason for the increase over fiscal year 1972?

Admiral BAGLEY. The increased costs reflect the growth in the medical and submarine continuation programs plus a full year cost of the January 1, 1972, pay increase, as applicable.

Chairman ELLENDER. We have already discussed the situation in connection with doctors. Please indicate the situation in connection with the adequacy of dentists.

Admiral BAGLEY. We foresee no difficulty in meeting fiscal year 1973 requirements under present conditions. However, in a zero-draft climate shortfalls are anticipated as follows:

	Fiscal year—				
	1973	1974	1975	1976	1977
Requirements	1,925	1,925	1,925	1,925	1,925
End strengths, no draft	1,691	1,546	872	512	441
Shortfalls	234	379	1,053	1,413	1,484

BASIC ALLOWANCE FOR QUARTERS

Chairman ELLENDER. For "Basic allowance for quarters" the fiscal year 1973 request is $119,148,000, another increase over the $105,387,000 provided in fiscal year 1972. Is this occasioned by an increase in rates?

Admiral BAGLEY. Yes, sir. The increase for this item is due primarily to the full year implementation of new statutory rates effective November 14, 1971.

Senator YOUNG. Please describe this budget project generally.

Admiral BAGLEY. This budget project "Basic allowances for quarters" is the monetary allowance paid to an officer based on his rank-and-dependency status when Government quarters are not available to the member and his dependents. However, in the case of those members occupying substandard family quarters, the member is paid the difference between the full basic allowance for quaretrs, based on his rank, and the fair rental value of the quarters occupied.

BASIC ALLOWANCE FOR SUBSISTENCE

Chairman ELLENDER. For "Basic allowance for subsistence" the fiscal year 1973 request is $41,834,000 as compared with the $42,265,000 provided in fiscal year 1972. I note that the rate has not changed in the past 3 years. Is there anything of importance to bring to the attention of the committee in connection with this project?

Admiral BAGLEY. Sir, there has been no change in the statutory rate for "Basic allowance for subsistence" for officers. The decrease in this item is due to the reduction in officer man-years.

STATION ALLOWANCES, OVERSEAS

Chairman ELLENDER. For "Station allowances, overseas" the fiscal year 1973 request is $2,883,000 while that for fiscal year 1972 is $3,135,000. The reduction seems to be mainly attributable to the housing allowance. Please comment.

Admiral BAGLEY. The reduction is primarily attributable to the decrease in the housing allowance based on the increase in statutory rates for basic allowance for quarters, whereby a comparable downward adjustment is made in the housing allowances overseas.

In addition, this project includes adjustments due to the foreign currency revaluation.

UNIFORM ALLOWANCES

Chairman ELLENDER. For the "Uniform allowances" the fiscal year 1973 request is for $2,061,000 as compared with $2,410,000 for fiscal year 1972. Do you have any comment on this?

Admiral BAGLEY. Yes, sir. The lower cost in fiscal year 1973 is directly related to the lower number of officer accessions in that year compared to fiscal year 1972.

Senator YOUNG. Explain the active duty allowance.

Admiral BAGLEY. The active duty clothing allowance is payable to Naval Reserve officers entering and reentering on active duty for more than 90 days, providing 2 years have elapsed since the last entry on active duty. Further, this allowance is payable to Naval Reserve Of-

ficer Training Corps (NROTC) graduates who are commissioned in the Regular Navy at the time they report to their first duty station. An initial uniform allowance of $200 is provided to these NROTC personnel upon graduation and commissioning.

FAMILY SEPARATION ALLOWANCE

Chairman ELLENDER. For the "Family separation allowance" the fiscal year 1973 request is $2,481,000. This is down a bit from the fiscal year 1972 amount of $2,775,000. Please describe this project generally.

Admiral BAGLEY. Yes, sir. Officers with dependents, who are entitled to basic allowance for quarters may receive a monthly allowance of $30 if they are on shipboard duty away from their home port for a continued period of more than 30 days, or if they are on temporary duty or temporary additional duty away from their permanent station for more than 30 days and their dependents do not accompany them to such station.

Also, any time the movement of his dependents to his permanent station or a place near that station is not authorized at Government expense, and the dependents do not in fact reside with the officer, the officer may receive a monthly family separation allowance of $30.

SEPARATION PAYMENTS

Chairman ELLENDER. For "Separation payments" the fiscal year 1973 request is $27,686,000. The fiscal year 1972 appropriation was $27,002,000. Indicate the nature of the increase, which I believe relates to rate increases.

Admiral BAGLEY. Mr. Chairman, this increase is the net result of the two pay increases effective during fiscal year 1972, partially offset by a reduction in the number of planned losses in fiscal year 1973.

SOCIAL SECURITY TAX, EMPLOYER'S CONTRIBUTION

Chairman ELLENDER. For the "Social security tax, employer's contribution" the request for fiscal year 1973 is $35,223,000, an increase over the $31,006,000 of fiscal year 1972. Please indicate the reason for this.

Admiral BAGLEY. This item represents the Government's contribution, as an employer, to social security. There are basically two reasons for the increase in social security in fiscal year 1973. Effective January 1, 1973, the tax will rise from 5.20 percent on a tax base of $9,000 to 5.65 percent. Additionally, as a result of the pay raises provided during fiscal year 1972, there will be a higher taxable base in fiscal year 1973. There is a partial offset due to the strength reduction in fiscal year 1973.

PAY AND ALLOWANCES OF ENLISTED PERSONNEL

Chairman ELLENDER. At this point in the record there will appear a tabulation from the justifications entitled "Pay and allowances of enlisted personnel."

(The information follows:)

BUDGET ACTIVITY 2: PAY AND ALLOWANCES OF ENLISTED PERSONNEL—SUMMARY OF OBLIGATIONS

[In thousands of dollars]

Budget project title	1971 actual	1972 estimate	1973 estimate
1. Basic pay	$2,261,462	$2,502,438	$2,686,083
2. Incentive pay for hazardous duty	39,094	38,372	37,356
3. Special pay	73,693	64,218	53,238
4. Proficiency pay	41,880	43,448	43,176
5. Reenlistment bonus	87,147	99,229	105,560
6. Basic allowance for quarters	262,077	322,008	347,523
7. Station allowances overseas	7,522	7,488	7,347
8. Clothing allowances	60,309	64,735	69,232
9. Family separation allowance	13,183	12,491	11,509
10. Separation payments	73,189	76,667	88,235
11. Social security tax, employer's contribution	112,357	129,778	144,888
Total obligations	3,031,913	3,360,872	3,594,147
Reimbursable obligations	−2,382	−6,686	−6,606
Total direct obligations	3,029,531	3,354,186	3,587,541

OFFICER-ENLISTED PERSONNEL RATIO

Chairman Ellender. Please indicate the officer to enlisted personnel ratio for fiscal years 1971, 1972, and 1973 and comment on this.

Admiral Bagley. The officer to enlisted personnel ratios for fiscal years 1971, 1972, and 1973 are as follows:

Fiscal year:	Amount
1971	1:7.3
1972	1:7.1
1973	1:7.3

The fiscal year 1971 officer to enlisted ratio is derived from actual data as of June 30, 1971. The ratios shown for fiscal years 1972 and 1973 are projected as of the end of each fiscal year.

BASIC PAY

Chairman Ellender. For "Basic pay" of enlisted personnel the fiscal year 1973 request is $2,686,083,000. The amount provided for this budget project in fiscal year 1972 was $2,502,438,000. The number of enlisted personnel estimated for fiscal year 1973 is 524,130 as compared with 529,572 for 1972. Does the increase in the request relate only to the increase in the rate of pay?

Admiral Bagley. Yes, sir, it does.

INCENTIVE PAY FOR HAZARDOUS DUTY

Senator Young. For "Incentive pay for hazardous duty" for enlisted personnel the fiscal year 1973 request is $37,356,000, while the same for fiscal year 1972 was $38,372,000. Describe this account generally, please.

Admiral Bagley. This account covers the incentive pay for hazardous duty to personnel in the following types of duty:

(1) Duty involving frequent and regular participation in aerial flight as a crew or non-crew member.

(2) Duty on board a submarine.

(3) Duty involving parachute jumping.

(4) Duty in high or low pressure chambers and as experimental subjects in acceleration, deceleration and thermal stress experiments.

(5) Duty or training involving demolition of explosives as a primary part of duties.

(6) Duty as member of flight deck crew of an aircraft carrier.

Chairman ELLENDER. Indicate the nature of the payments to noncrew members under "flying duty."

Admiral BAGLEY. Enlisted members of the U.S. Navy ordered to perform duty involving flying as noncrew members are eligible to receive incentive pay in the amount of $55 per month.

Example of instances where non-crew-member flight orders may be issued to noncrew members are as follows:

(*a*) Enlisted members under instruction in an established school or course in which airborne instruction is part of the curriculum and clearly contributes to the technical knowledge of the trainee. This includes members participating in a prescribed course of instruction in an aircraft squadron to qualify as aircrewmen in the type aircraft of that squadron.

(*b*) Enlisted members whose duties require frequent and regular participation in aerial flights for such purposes as installation, test, research, or evaluation of airborne technical equipment which cannot be performed by other members already under flight orders.

Senator YOUNG. I note that those personnel on submarine duty receive from $686 to $1,260 for such duty, in addition to their other emoluments. What is the situation in regard to securing personnel to fill these slots?

Admiral BAGLEY. Sir, our problems in procuring and retaining quality personnel for submarine crews are increasing. Reduced draft calls have had the effect of lowering the number of volunteers for the Navy and, consequently, reducing the base of quality personnel who are eligible to serve in submarines. Most significantly, we are experiencing a decline in reenlistments among experienced personnel. Our most severe experience shortage is in nuclear trained enlisted personnel, but we are also confronted with experience shortages in the torpedoman's mate (TM), quartermaster (QM), interior communications electrician (IC), and storekeeper (SK) ratings in submarines.

SPECIAL PAY

Chairman ELLENDER. For "Special pay" for enlisted personnel that fiscal year 1973 request is $53,238,000, somewhat lower than the $64,218,000 provided in fiscal year 1972. Describe what is encompassed in "special pay."

Admiral BAGLEY. The types of duty for which "special pay" is payable re (1) sea duty pay—duty aboard a ship; (2) duty at certain places—duty overseas at Department of Defense designated locations, including Vietnam; (3) duty involving diving; and (4) other special pay—hostile fire pay.

PROFICIENCY PAY

Chairman ELLENDER. For "Proficiency pay" for enlisted personnel the fiscal year 1973 request is $43,176,000, about the same as the amount of $43,448,000 provided for fiscal year 1972. Please describe "specialty pay."

Admiral BAGLEY. Mr. Chairman, "specialty pay" is one of the three categories of proficiency pay and is a monetary incentive designed to assist the Department of Defense in attaining and sustaining adequate career manning levels in designated military specialties. Its principle objective is to increase the number of first term and career reenlistments of members who are qualified and serving in designated military specialties. A secondary objective is to induce career personnel in other military specialties to qualify for, enter into, and continue to serve in these designated military specialties.

Senator YOUNG. Describe the "Special duty assignments" and "Superior performance" items and comment on the fact that "Superior performance" was included in 1971 but omitted for the later years while "Special duty assignments" was picked up in 1972 and 1973 but omitted from 1971.

Admiral BAGLEY. Yes, sir. Special duty assignment (proficiency pay) is designed to assist in attaining and sustaining on adequate volunteer manning level in designated critical special duty assignments. Superior performance (proficiency pay) is designed to encourage and reward superior performance in those military skills not designated for award of shortage specialty or special duty assignment pay.

In fiscal year 1971 Navy received authorization to pay superior performance pay ($30) to Navy recruit company commanders, Navy recruit canvassers and survival, evasion, resistance and escape (SERE) instructors. In preparing the fiscal year 1972 proficiency pay program, DOD provided guidance that these generic groups then receiving superior performance pay should more properly come under the category and satisfy the eligibility criteria for special duty assignment pay. The outcome was that for fiscal year 1972 Navy was authorized to award special duty assignment (proficiency pay) to the following:

	Dollars
Recruit company commanders	50
Recruit canvassers	50
Rating control petty officers	50
Survival, evasion, resistance and escape (SERE) instructors	50
Career counselors	30

This same listing was approved for fiscal year 1973.

Senator YOUNG. Also describe "Specialty pay, terminations," including the omission of such pay for T–1 personnel in fiscal year 1973.

Admiral BAGLEY. Termination pay is required to be paid to members serving in a military specialty designated for termination of award of their shortage specialty (proficiency pay). The termination pay is phased in increments so as not to impose an undue financial burden due to the sudden loss of the award.

T–1 personnel in fiscal year 1972 were those members who in fiscal year 1971 were awarded proficiency pay at level P1—$50 and whose specialties were terminated in fiscal year 1972 thereby providing them with payment of T1—$25 (one-half of the award level). These personnel are considered "paidoff" during fiscal year 1972 and are therefore not listed in fiscal year 1973 program. No P1—$50 skills are being terminated in fiscal year 1973; therefore we list no T–1 payoffs.

REENLISTMENT BONUS

Chairman ELLENDER. For the "Reenlistment bonus" the fiscal year 1973 request is $105,560,000. The amount provided for fiscal year 1972 was $99,229,000. You spoke to this earlier. Please describe the amounts provided for reenlistment.

Admiral BAGLEY. A regular bonus payment is one paid to an enlisted member who reenlists in the regular component of the same service within 3 months from the date of discharge or separation after compulsory or voluntary active duty, except active duty for training; or to an enlisted member who voluntarily extends his enlistment for 2 years or more. The cumulative amount of regular reenlistment bonus paid to a member under any provision of law may not exceed $2,000 (37 U.S.C. 308). Computation is as follows:

First reenlistment: 1 month's basic pay x number of years of reenlistment.

Second reenlistment: Two-thirds of 1 month's basic pay x number of years of reenlistment.

Third reenlistment: One-third of 1 month's basic pay x number of years of reenlistment.

Under present pay scales the $2,000 cumulative limit is usually reached at the first reenlistment point and almost always at the second reenlistment point.

The variable reenlistment bonus (VRB) is payable to certain enlisted members possessing critical military skills and entitled to a regular reenlistment bonus. The VRB payable is in addition to the regular bonus and may not exceed four times the regular bonus. The more critically manned ratings/skills—that is, those experiencing the most severe career manning shortages—receive the highest multiple—from one to four—of the regular reenlistment bonus.

A breakdown of Navy's "Reenlistment bonus" funds is as follows:

Regular reenlistment bonuses	$39,437,000
Variable reenlistment bonuses	66,123,000
Total	105,560,000

Chairman ELLENDER. What is the reason for the increase in cost?

Admiral BAGLEY. The increased costs for reenlistment bonus is due to a higher number of planned entitlements plus the full year implementation of the two pay increases.

BASIC ALLOWANCE FOR QUARTERS

Chairman ELLENDER. For "Basic allowance for quarters" the fiscal year 1973 request is $347,523,000. The fiscal year 1972 appropriation was $322,008,000. Please indicate the reason for the requested increase.

Admiral BAGLEY. The increase in basic allowance for quarters is due to the full year implementation of the new statutory rates, but has been partially offset by lower numbers of people who are planned to be entitled to such allowances.

STATION ALLOWANCES, OVERSEAS

Chairman ELLENDER. For "Station allowances, overseas" the fiscal year 1973 request is $7,347,000. The fiscal year 1972 amount was $7,488,000. Please describe what the station allowances are.

Admiral BAGLEY. I will be happy to. Cost of living and housing allowances provide payment for the increased cost of living and housing for members on duty outside the Continental United States.

Temporary lodging allowance is payable to a member for a period up to 60 days upon arrival at an overseas station. Also a member may be paid this allowance for 10 days preceding departure from an overseas station. The number of days of temporary lodging may be extended for both arrival and departure.

Senator YOUNG. I notice that you estimate the same number in each category as those for 1972, but the difference in the request results from a reduction in the rate between the two years: from $91 for cost of living in 1972 to $68 in 1973. How do you anticipate this will be accomplished?

Admiral BAGLEY. Mr. Chairman, in the process of reviewing our computation we find that while the total numbers of people and dollars requested are correct, we erroneously transcribed dollars between cost of living and housing allowance. The corrected data is as follows:

	1972 estimate			1973 estimate		
	Number	Rate	Amount (thousands)	Number	Rate	Amount (thousands)
Cost of living	9,963	$278	$2,766	9,963	$286	$2,852
Housing	3,304	275	908	3,304	206	680
Temporary lodging	8,928	427	3,814	8,928	427	3,815
Total			7,488			7,347

The reduction in requested funds is primarily attributable to the decrease in the housing allowance based on the increase in statutory rates for basic allowance for quarters. This necessarily requires a comparable downward adjustment in housing allowances overseas since the difference between basic allowance for quarters and this allowance is narrowed.

Additionally, this project includes a small increase due to the foreign currency revaluation.

CLOTHING ALLOWANCES

Chairman ELLENDER. For the "Clothing allowances" for fiscal year 1973 the request is $69,232,000. For fiscal year 1972 the amount provided was $64,735,000. Please justify the increase in the request.

Admiral BAGLEY. Mr. Chairman, the primary reason for the requested increase is the considerably higher number of recruits requiring initial clothing issues in fiscal year 1973. Partial offsets to this increase are generated from fewer numbers of personnel drawing maintenance allowances because of reduced overall enlisted strength, and there is no requirement for the special issue of working uniforms in fiscal year 1973.

Chairman ELLENDER. There is one item you might explain: "On advancement to pay grade E–7." Is a different or new uniform issued on this occasion?

Admiral BAGLEY. Yes, sir. In the U.S. Navy, the chief petty officer, senior chief petty officer, and master chief petty officer, corresponding to pay grades E–7, E–8, and E–9, wear a uniform distinctive to their pay grade and status. An enlisted member normally receives a special initial clothing monetary allowance at the time of or soon after first advancement to or enlistment in that rating.

Senator YOUNG. Does not an E–7 also receive a $100 basic maintenance allowance and/or a standard maintenance allowance?

Admiral BAGLEY. Yes, sir. An E–7, E–8, or E–9, of the U.S. Navy normally receives a basic or standard clothing maintenance allowance of $8.40 per month.

FAMILY SEPARATION ALLOWANCE

Chairman ELLENDER. For "Family separation allowance" for enlisted personnel for fiscal year 1973 the request is $11,509,000, a decrease from the amount of $12,491,000 provided in fiscal year 1972. Are there any changes of substance in this that you might wish to bring to the committee's attention?

Admiral BAGLEY. Mr. Chairman, I would like to say that our slightly lower funding requirement in fiscal year 1973 for this project is largely because of reduced deployments.

SEPARATION PAYMENTS

Chairman ELLENDER. For "Separation payments" the fiscal year 1973 request is $88,235,000, an increase over the $76,667,000 provided for fiscal year 1972. Please justify this increase.

Admiral BAGLEY. Yes, sir. This increase is directly a result of the greater number of enlisted personnel who will be completing their obligated service in fiscal year 1973 as well as the full year implementation of the two pay raises effective during fiscal year 1972.

SOCIAL SECURITY TAX, EMPLOYER'S CONTRIBUTION

Chairman ELLENDER. For the "Social security tax, employer's contribution" the fiscal year 1973 request is $144,888,000. For fiscal year 1972 the amount provided was $129,778,000. What is the reason for the increase?

Admiral BAGLEY. Mr. Chairman, this item represents the Government's contribution, as an employer, to social security. There are basically two reasons for the increase in social security in fiscal year 1973. Effective January 1, 1973, the tax will rise from 5.20 percent on a tax base of $9,000 to 5.65 percent. Additionally, as a result of the pay raises provided during fiscal year 1972, there will be a higher taxable base in fiscal year 1973. There is a partial offset due to the strength reduction in fiscal year 1973.

PROMOTION OF ENLISTED PERSONNEL

Chairman ELLENDER. I wish you would also provide a tabulation showing promotion of enlisted personnel for fiscal years 1971, 1972, and 1973.

Admiral BAGLEY. Yes, sir; I will be happy to.

(The information follows:)

	Fiscal year 1971 (actual)	Fiscal year 1972 (projected)	Fiscal year 1973 (projected)
E-9	800	1,133	720
E-8	2,272	2,846	2,143
E-7	5,487	5,650	6,309
E-6	9,564	10,948	13,937
E-5	37,013	37,886	43,570
E-4	70,467	67,550	94,193
E-3	64,756	57,794	56,088
E-2	53,151	58,059	95,765
E-1	0	0	0
Total	243,510	241,866	312,725

PAY AND ALLOWANCES OF CADETS

Chairman ELLENDER. At this point in the record there will appear a summary of requirements by project for "Pay and allowances of cadets."

(The information follows:)

BUDGET ACTIVITY 3: PAY AND ALLOWANCES OF CADETS—SUMMARY OF OBLIGATIONS

[In thousands]

Budget project title	1971 actual	1972 estimate	1973 estimate
Midshipmen	$14,314	$15,843	$16,769
Total obligations	14,314	15,843	16,769
Reimbursable obligations			
Total direct obligations	14,314	15,843	16,769

Chairman ELLENDER. For "Pay and allowances of cadets" the fiscal year 1973 request is for $16,769,000. The amount provided for fiscal year 1972 was $15,843,000. Please account for the increase in cost.

Admiral BAGLEY. Yes, sir. The increase in the request for "Pay and allowances of cadets" for fiscal year 1973 is a direct result of the full-year implementation of the two pay increases that were authorized during fiscal year 1972, partially offset by the full-year implementation of the reduction in the commuted ration rate and a slightly lower average strength.

Senator YOUNG. I note that the commuted ration allowance for midshipmen was reduced from $602.21 in fiscal year 1972 to $594.95 in 1973. How was that accomplished?

Admiral BAGLEY. Mr. Chairman, this is a combination of a reduction in the authorized daily ration rate from $1.66 through the first half of fiscal year 1972 to $1.63, effective January 1, 1972, and the fact that there is 1 day less in fiscal year 1973 since fiscal year 1972 included leap year.

Senator YOUNG. Please comment generally on the morale at the Naval Academy.

Admiral BAGLEY. The morale at the Naval Academy is good. The attitude of the individual midshipman is constantly under observation.

The superintendent and the commandant of the midshipmen maintain a continuous evaluation of the criteria and regulations governing the conduct of the midshipmen. Progress has been made in recent months which has a direct impact on the morale of the midshipmen by the changing of some regulations, giving more personnel freedom consistent with military discipline and instilling more individual responsibility.

Senator YOUNG. Are you experiencing any difficulty in acquiring entering personnel of the same or better quality than in previous years?

Admiral BAGLEY. No, sir. The quality of the personnel entering the Academy in the past few years has been very good and we anticipate it will continue. This is due to the high number of nominees that we have which makes for better selectivity. I would like to point out a factor that greatly assists us in getting better quality. The majority of personnel who enter the Academy come from congressional sponsors. A Member of Congress can only submit 10 nominations for each vacancy. It is a known fact that Congressmen generally have between 50 to 500 applicants to select 10 nominees. We, therefore, are assured of a high degree of selectivity in processing these candidates.

Chairman ELLENDER. Please supply a tabulation similar to that provided last year indicating the academic profile of the current classes at the Naval Academy.

Admiral BAGLEY. Yes, sir. A tabulation indicating the academic profile of the current classes at the Naval Academy is as follows:

	Class of—			
	1972	1973	1974	1975
Nominated	5,467	6,038	7,076	7,297
Admitted	1,369	1,380	1,399	1,332
Rank in high school class (percent):				
Top 1/5	73	70	69	72
2d 1/5	21	21	22	19
Boys State representative	19	16	19	22
Class office or student body officer	31	37	37	36
Eagle Scout	9	9	8	9
National Honor Society	36	36	38	37

SUBSISTENCE OF ENLISTED PERSONNEL

Chairman ELLENDER. At this point in the record there will appear a summary of requirements by project for "Subsistence of enlisted personnel."

(The information follows:)

BUDGET ACTIVITY 4: SUBSISTENCE OF ENLISTED PERSONNEL—SUMMARY OF OBLIGATIONS

[In thousands]

Basic project title	Fiscal year		
	1971 actual	1972 estimate	1973 estimate
Basic allowances for subsistence	$131,122	$126,425	$122,597
Subsistence in kind	179,356	165,769	155,698
Total obligations	310,478	292,194	278,295
Reimbursable obligations	−28,670	−19,383	−19,393
Total direct obligations	281,808	272,801	258,902

Chairman ELLENDER. For "Subsistence of enlisted personnel" the fiscal year 1973 request is for $258,902,000, a reduction from the amount provided for fiscal year 1972 of $272,801,000. For "Basic allowance for subsistence" the request for fiscal year 1973 is $122,597,000, a slight decrease from the $126,425,000 provided for fiscal year 1972. I note a decrease in the rate. Is the reason similar to that in connection with midshipmen?

Admiral BAGLEY. Yes, sir.

Chairman ELLENDER. For "Subsistence in kind" the fiscal year 1973 request is for $155,698,000 as compared with the $165,769,000 provided in fiscal year 1972. Please discuss this reduction.

Admiral BAGLEY. Yes, sir. The reduction in the request for "Subsistence in kind" from fiscal year 1972 to fiscal year 1973 is directly related to the reduction in the ration rate afloat, and the man-year strength reduction.

Senator YOUNG. Please explain the item "Special rations."

Admiral BAGLEY. The request for "special rations" provides for subsistence in kind at Government hospital messing facilities for inactive retired and Fleet Reserve enlisted personnel when under treatment at such hospitals. The estimated number is based on last years actual expenses and the rate is the actual value of the hospital ration which is also based on actual experience. The other item included in the "special ration" project is the request to provide for contract messing. A contract mess is a mess operated by a commercial contractor for the purpose of providing rations in kind to enlisted personnel. Contract messes are normally authorized for short periods of time when the Navy general mess in inoperative due to casualty, overhaul, renovation or repair, or deactivation, or the establishment of a general mess is not economical. The "Deep Freeze" line item is no longer appropriate, but is included since past year funds were involved.

Senator YOUNG. Also describe the items under "Augmentation rations."

Admiral BAGLEY. An explanation of each line item under "Augmentation rations" follows:

1. Flight/boat rations—Flight meals are furnished to Naval service members and Department of the Navy civilian employees engaged in flight operations. The ration is supplementary to any ration or subsistence allowance to which the members of employees are otherwise entitled. However, the flight ration may not be furnished without charge to any person to whom a per diem allowance is granted in place of subsistence.

2. Emergency rations—Includes individual combat meals, abandon ship survival food packets, aircraft life raft packets, long range patrol food packets, and general purpose survival food packets. The estimated request is based on the past year's experience. Items become a charge to the appropriation when they are placed aboard and are rotated at the end of shelf life—approximately 2 to 3 years.

3. Custom foods—These are foods that have been processed to eliminate waste, reduce bulk and where possible eliminate the need for refrigerated storage. These foods incorporate the advantages of dehydration, freeze dehydration and some preprocessing. They are primarily used to increase the ship's endurance and/or reduce preparation, waste and manpower.

4. Supplemental allowances—The supplemental food allowance is a prescribed quantity of food, defined by quantity, or monetary value, which, due to unusual or extraordinary circumstances, is required in addition to the basic daily food allowance. This allowance may be prescribed for any vessel, station detachment, or base having an authorized complement of less than 150 enlisted members, or when a vessel, station, detachment, or base is operating under conditions warranting an increase.

5. Submarine augmentation—The submarine augmentation is the additional daily monetary allowance needed to provide subsistence on submarines. This is the amount used in excess of that required for surface ships. Due to environmental conditions and to gain endurance, submarines, of necessity, must use custom foods, prefabricated and special processed food items in which all non-edible portions are removed and/or require little processing prior to preparation.

Chairman ELLENDER. I notice that for "Surveys/spoilage" you are budgeting over $2.5 million. Please comment.

Admiral BAGLEY. The budget request for "Surveys/spoilage" provides for the cost of subsistence losses due to surveys and spoilage as actually reported by each afloat mess. Food supplies normally returned to store upon ship deactivations, but unfit for reissue to other ships, are also included.

Chairman ELLENDER. What is the reference to "Sales of meals—bulk subsistence"?

Admiral BAGLEY. This is a balancing item to mathematically derive the gross subsistence requirements as it is not included in the other budget items in this subhead. The identical amount is then subtracted out as being reimbursable in the next to the last line on page 1–49. These line items are necessary to derive gross and direct funding requirements as has been done for all other budget activities. We are not requesting funds for this item. The components of the reimbursable program are as follows:

[In thousands of dollars]

Source	Fiscal years		
	1971	1972	1973
Naval Reserves	1,900	1,900	1,900
Marine Corps	7,300	0	0
Army	1,665	0	0
Air Force	290	0	0
National Science Foundation	0	596	596
Other	1,295	1,295	1,295
Other agencies (cash)	170	558	558
Cash sales	5,250	5,250	5,250
Bulk sales	10,800	9,794	9,794
Total	28,670	19,393	19,393

PERMANENT CHANGE OF STATION TRAVEL

Chairman ELLENDER. At this point in the record there will appear a summary of requirements by project of "Permanent change of station travel."

(The information follows:)

BUDGET ACTIVITY 5: PERMANENT CHANGE OF STATION TRAVEL—SUMMARY OF OBLIGATIONS

[In thousands]

Budget project title	1971 actual	1972 estimate	1973 estimate
Accession travel	$29,863	$33,971	$37,527
Training travel	29,080	28,940	28,427
Operation travel	53,679	63,973	60,325
Rotational travel	73,123	87,860	82,613
Separation travel	48,463	44,482	45,557
Travel of organized units	6,564	4,694	10,560
Total obligations	240,772	263,920	266,009
Reimbursable obligations	−100	−6,080	−6,080
Total direct obligations	240,672	257,840	259,929

ACCESSION TRAVEL

Chairman ELLENDER. For "Accession travel" for enlisted personnel the fiscal year 1973 request is for $37,527,000, an increase over the $33,971,000 provided for fiscal year 1972. Please justify this increase.

Admiral BAGLEY. This increase is required to support 32,000 additional accession moves which will be necessary to accommodate the planned personnel gains and attain the approved end strength for fiscal year 1973. Such gains are unusually high in fiscal year 1973, because of the men who entered the Navy during the high input year in fiscal year 1969 and will then be completing their enlistments.

TRAINING TRAVEL

Chairman ELLENDER. For "Training travel" the fiscal year 1973 request is $28,427,000, about the same as the $28,940,000 provided for fiscal year 1972. Are there any changes of significance in this account?

Admiral BAGLEY. No, sir. However, there is a small decrease in the total number of training moves required in fiscal year 1973, compared to fiscal year 1972.

OPERATIONAL TRAVEL

Chairman ELLENDER. For "Operational travel" the fiscal year 1973 request is $60,325,000, a slight reduction from the $63,973,000 provided for fiscal year 1972, but still considerably above the amount required for fiscal year 1971. Please comment.

Admiral BAGLEY. While the total requirements for operational moves is about 6,000 less in fiscal year 1973 as compared to fiscal year 1972, the average costs of these moves continues to escalate. The increase from fiscal year 1971 to fiscal year 1972 is misleading in that fiscal constraints forced the Navy to defer fiscal year 1971 moves into fiscal year 1972, in addition to the moves that would have otherwise been required in fiscal year 1972.

ROTATIONAL TRAVEL

Senator YOUNG. For "Rotational travel" the fiscal year 1973 request is $82,613,000, down a bit from the $87,860,000 provided for fiscal year 1972. Please provide a description of the method by which personnel are assigned to the various modes of overseas travel.

Admiral BAGLEY. The basic policy for selecting the mode of transportation overseas is to provide suitable transportation at least cost to the Government. This means that when a person is ordered to proceed from one station to another, a determination is made of the least costly method of travel from an overall viewpoint including per diem costs. When the travel is by air, it involves either Military Airlift Command (MAC) aircraft or U.S. airlines. Foreign airlines are used only when there is no other means available. The utilization of surface commercial travel is generally limited to U.S. commercial passenger vessels, but since the number of vessels in use is very limited—four in the Pacific—only a very small number of persons move in this manner.

Senator YOUNG. Is there any item of significance to be brought to the attention of the committee in connection with this account?

Admiral BAGLEY. Yes, sir. Along with the reduction of about 6,000 moves in the operational category previously mentioned, we have reduced our requirements for rotational moves by about 5,000 moves in fiscal year 1973 as compared to fiscal year 1972.

SEPARATION TRAVEL

Chairman ELLENDER. For "Separation travel" the fiscal year 1973 request is for $46,557,000, an increase over the $44,482,000 provided for fiscal year 1972. Please justify this increase.

Admiral BAGLEY. This increase is required to support about 21,000 additional moves necessitated by the large number of losses occurring in fiscal year 1973 because of the heavy personnel input in fiscal year 1969 whose enlistments will expire in fiscal year 1973.

Chairman ELLENDER. I note a steadily declining number of midshipmen entitled to separation travel. Please explain.

Admiral BAGLEY. Yes, sir. The attrition at the Naval Academy in fiscal year 1971 and 1972 was higher than normal. This higher attrition occurred among the 3d and 4th classmen and two-thirds of the additional losses were resignations for personal reasons. This is attributed to the change in the draft situation which has occurred since the time these young men applied for entrance to the Naval Academy. This higher loss rate is leveling off and the losses for fiscal year 1973 are projected at a lower rate.

ORGANIZED UNIT TRAVEL

Chairman ELLENDER. For "Organized unit travel" the fiscal year 1973 request is $10,560,000. This is more than double the amount required for fiscal year 1972, which amounted to $4,694,000. Please explain.

Admiral BAGLEY. This large increase is primarily required to support the 85 percent increase in the number of families moving because of planned changes of home port, home yard, or permanent duty station of vessels, aviation squadrons and units. The magnitude of these planned changes reflect activations and deactivations of operating units, the current policy of increasing the homeporting of ships overseas, and resulting rebalancing of operating units within and between fleets. Additionally, a relatively small portion of the requested funds are in support of the continuing increase in the cost of moving people.

TRAVEL REDUCTION EFFORT

Chairman ELLENDER. Please describe what efforts have been made in the past year to reduce travel costs.

Admiral BAGLEY. We have taken the following management actions to reduce travel costs.

(*a*) Tour lengths have been extended where feasible.

(*b*) Reassignment within same geographical area has been maximized.

(*c*) Minimized short tour assignments.

(*d*) Temporary duty and briefings en route between duty stations are being minimized.

(*e*) Personnel will not be reassigned solely because of promotions, reclassification, or change in specialty.

(*f*) Guaranteed acceptance and encouraged requests for voluntary extension for sea duty in 2-year increments.

(*g*) Offered overseas extensions up to 48 months to personnel in short sea tour ratings.

(*h*) Requests for voluntary extension of shore tour ratings encouraged and favorably considered.

(*i*) Liberalized early out policy prevents multiple reassignment of short-timers from overseas activities and Vietnam.

(*j*) Revised screening standards for personnel selected for assignment to overseas duty, new construction ships and other special programs will insure personnel qualification and eligibility and preclude replacement.

Chairman ELLENDER. What efforts are contemplated in fiscal year 1973 to reduce travel costs?

Admiral BAGLEY. Management actions to substantially reduce the number of PCS moves will be continued, refined, and reenforced. There will be continued improvement of the PCS control system which has been developed in recent years. One such item will be the allocation of moneys into fixed operating targets—OPTARS—for individual assignment detailers or desk which will engender greater cost consciousness and more cost-effective assignment decisions.

Of greater significance, we are developing an automated analytical enlisted rotation model which will optimize sea/shore rotation, activity tour lengths, overseas area tours, and prescribed sea tour by discrete occupational groupings. Planning and management analysis supported by the model can be expected to minimize the gross number of enlisted PCS moves, as well as the average cost.

OTHER MILITARY PERSONNEL COSTS

Chairman ELLENDER. At this point in the record there will appear a summary of requirements by project of "Other military personnel costs."

(The information follows:)

BUDGET ACTIVITY 6: OTHER MILITARY PERSONNEL COSTS—SUMMARY OF OBLIGATIONS

[In thousands]

Budget project title	1971 actual	1972 estimate	1973 estimate
Apprehension of military deserters, absentees, and escaped military prisoners	$277	$275	$275
Interest on uniformed services savings deposits	4,436	4,510	4,589
Death gratuities	2,027	2,190	2,233
Servicemen's group life insurance	15,026	1,771	1,085
Total obligations	21,766	8,746	8,182
Reimbursable obligations			
Total direct obligations	21,766	8,746	8,182

APPREHENSION OF MILITARY DESERTERS

Chairman ELLENDER. The first item under "Other military personnel costs" is "Apprehension of military deserters, absentees, and escaped military prisoners." The fiscal year 1973 request is for $275,000. Would you please comment on this?

Admiral BAGLEY. Yes, sir. This budget request provides funds for travel of guards and reimbursement for rewards and/or actual expenses paid to persons or agencies in connection with apprehension and delivery of military deserters, absentees, and escaped military prisoners to military control.

Senator YOUNG. What is the normal procedure relative to military personnel who are apprehended after having been absent from their posts for a considerable period of time?

Admiral BAGLEY. Mr. Chairman, under the provisions of the Uniform Code of Military Justice, those persons in the Naval service who have been apprehended and are awaiting trial by courts-martial may not be punished. They may, however, be placed in a restricted or confined status while awaiting trial in order to insure their presence at trial. The maximum penalty for conviction of desertion is 5 years confinement, a dishonorable discharge, reduction in rate to E–1, and forfeiture of all pay and allowances. However, very few Navy members are convicted of desertion—approximately 48 in fiscal year 1970. The maximum penalty for conviction of unauthorized absence of over 30 days is 1 year confinement and a dishonorable discharge—reduction in rate to E–1, and forfeiture of all pay and allowances.

Punishment for those apprehended and suspected of an offense under the Uniform Code may only be awarded pursuant to the sentence of a courts-martial or the nonjudicial punishment action of a commanding officer under article 15, UCMJ.

INTEREST ON SAVINGS DEPOSITS

Chairman ELLENDER. For "Interest on uniformed services savings deposits" the fiscal year 1973 request is for $4,589,000, increased

slightly over the $4,510,000 provided for fiscal year 1972. Does this result from an increase in the number of overseas personnel participating or merely an increase in deposits?

Admiral BAGLEY. The increase in the budget request in fiscal year 1973 for "Interest on uniformed services savings deposits" is a direct result of the increase in the value of the average deposit. The increase in value of the average officer and enlisted deposits from January 1971 to January 1972 was 20.4 and 14.7 percent, respectively. This increase is partially offset by the reduction in the number of overseas personnel participating in the program.

DEATH GRATUITIES

Chairman ELLENDER. For "Death gratuities" the fiscal year 1973 request is for $2,233,000, an increase over the $2,190,000 provided for fiscal year 1972. Please explain.

Admiral BAGLEY. Mr. Chairman, the death gratuity payment is based on 6 months' basic pay—plus special pay and incentive pay—at the rate to which the decedent was entitled on the date of his death. The Servicemen's and Veterans' Survivors Benefit Act provides that the gratuity may not exceed $3,000. The increase in the amount requested for this project from fiscal year 1972 to fiscal year 1973 reflects the full year implementation of the pay increases that were authorized during fiscal year 1972. This increase was partially offset by the projected decrease in the number of deaths that will occur consistent with the planned overall Navy strength.

SERVICEMEN'S GROUP LIFE INSURANCE

Chairman ELLENDER. For the "Servicemen's Group Life Insurance" the request is for $1,085,000, a reduction from the $1,771,000 provided for fiscal year 1972. Please describe this program.

Admiral BAGLEY. Mr. Chairman, the Servicemen's Life Insurance program established by Public Law 89–214 became effective on September 29, 1965, and automatically insured any member of the uniformed services on active duty for over 30 days against death in the amount of $10,000, unless such member elected in writing (1) not to be insured, or (2) to be insured in the amount of $5,000.

Public Law 91–291 increased the coverage effective June 25, 1970, to the amount of $15,000, unless such member elects in writing (1) not to be insured, (2) to be insured in the amount of $5,000, or (3) to be insured in the amount of $10,000. The cost of the premium to each member insured is $1 for each $5,000 coverage per month.

This project provides for the Government's contribution for the cost of such insurance which is traceable to the extra hazard of active duty in the uniformed service. The Government's contribution was 50 percent for July 1971, 15 percent for August–October 1971, and has dropped to zero percent for the remainder of the fiscal year, which averages to 8 percent for all of fiscal year 1972. However, because of the history of erratic changes to the rate, particularly during a current year, and in recognition of continuing man-years of deployment, the contribution of 5 percent for fiscal year 1973 has been applied in the budget request.

SPECIAL ANALYSES

Chairman ELLENDER. The justifications also include a section entitled "Special analyses." The information contained in that section will be included in the record at this point.

(The information follows:)

SPECIAL ANALYSES

	Fiscal year—		
	1971	1972	1973
1. Military personnel assigned to communications activities (end strengths):			
Officers	1,251	1,355	1,290
Enlisted	14,777	15,057	14,625
Total	16,028	16,412	15,915
2. Military personnel assigned to ADP activities (end strengths):			
Officers	718	676	703
Enlisted	3,925	3,727	3,868
Total	4,643	4,403	4,571
3. Military personnel assigned to intelligence activities (end strengths):			
Officers	1,567	1,592	1,588
Enlisted	16,615	13,145	12,349
Total	18,182	14,737	13,937

TABLE 4.—MILITARY PERSONNEL ASSIGNED TO HEADQUARTERS ACTIVITIES

[Strength in whole numbers]

	Fiscal year 1971 actual				Fiscal year 1972 estimate				Fiscal year 1973 estimate			
	End strength			Civilian end strength total	End strength			Civilian end strength total	End strength			Civilian end strength total
	Officer	Enlisted	Total		Officer	Enlisted	Total		Officer	Enlisted	Total	
Departmental:												
SECNAV/staff offices	235	102	337	768	220	73	293	783	219	73	292	765
OPNAV	902	345	1,247	902	882	332	1,214	934	883	319	1,202	922
BUPERS	426	250	676	1,730	337	239	576	1,649	336	239	575	1,653
BUMED	114	30	144	336	124	30	154	328	135	41	176	332
CHNAVMAT	112	10	122	396	113	9	122	365	106	9	115	365
NAVINTCOM	61	58	119	96	67	49	116	85	68	54	122	86
NAVCOMMCOM	75	66	141	273	83	60	143	273	83	60	143	273
NAVSECGRU	199	307	506	175	171	281	452	185	169	281	450	185
OCEANAV	12	2	14	52	16	2	18	53	16	2	18	53
NAVWEASERV	22	9	31	19	24	6	30	20	24	6	30	20
MSC	30	37	67	316	30	31	61	330	30	31	61	330
MARCORPS	11	4	15	.....	11	4	15	.....	11	4	15	.....
Total departmental	2,199	1,220	3,419	5,063	2,078	1,116	3,194	5,005	2,080	1,119	3,199	4,984
Systems commands headquarters:												
ONR	39	4	43	411	41	3	44	411	40	3	43	411
NAVAIRSYSCOM	321	3	324	2,148	317	3	320	1,946	317	3	320	1,946
NAVORDSYSCOM	139	2	141	1,096	137	2	139	1,072	137	2	139	1,056
NAVSHIPSYSCOM	201	8	209	1,685	213	5	218	1,640	213	5	218	1,641
NAVELECSYSCOM	64	13	77	826	72	0	72	766	72	0	72	766
NAVSUPSYSCOM	102	22	124	558	106	17	123	546	101	9	110	546
NAVFACENGCOM	68	9	77	706	69	6	75	689	69	6	75	689
SSPO	68	7	75	414	67	5	72	407	67	5	72	407
Total systems commands headquarters	1,002	68	1,070	7,844	1,022	41	1,063	7,477	1,016	33	1,049	7,462

Major command headquarters:												
CINCLANTFLT	173	533	706	83	175	451	626	83	166	461	627	83
CINCPACFLT	188	377	565	46	201	333	534	59	206	366	572	62
CINCUSNAVEUR	103	120	223	28	99	100	199	28	119	120	239	28
CNT	52	50	102	80	14	75	89	75	12	68	80	75
CNRTC	34	47	81	30	41	34	75	30	41	36	77	30
Total major command headquarters	550	1,127	1,677	267	530	993	1,523	275	544	1,051	1,595	278
District commandants:												
CNO	465	465	930	812	394	332	726	794	447	367	814	760
CNRTC	169	230	399	435	169	195	364	434	169	195	364	438
Total district commandants	634	695	1,329	1,247	563	527	1,090	1,228	616	562	1,178	1,198
Unified commands:												
CINCPAC	158	252	410	165	153	233	386	198	137	201	338	194
CINCLANT	96	123	219	35	106	127	233	36	108	126	234	36
CINCEUR	67	93	160	----	70	82	152	----	69	80	149	----
CINCSOUTH	13	10	23	----	16	11	27	----	16	11	27	----
CINCSTRIKE	26	29	55	----	23	18	41	----	23	18	41	----
Alaskan Command	10	5	15	----	9	4	13	----	9	4	13	----
NORAD	9	0	9	----	11	0	11	----	11	0	11	----
CONAD	32	12	44	----	32	12	44	----	32	12	44	----
Total unified commands	411	524	935	200	420	487	907	234	405	452	857	230
Total	4,796	3,634	8,430	14,621	4,613	3,164	7,777	14,219	4,661	3,217	7,878	14,152

5. MILITARY PERSONNEL ASSIGNED TO ACTIVITIES OUTSIDE THE MILITARY SERVICE (END STRENGTHS)

	Fiscal year 1971 actual			Fiscal year 1972 estimate			Fiscal year 1973 estimate		
	Officer	Enlisted	Total	Officer	Enlisted	Total	Officer	Enlisted	Total
Other DOD activities:									
Office of Secretary of Defense	138	57	195	175	66	241	173	74	247
Office of Joint Chiefs of Staff	205	132	337	186	89	275	188	89	277
Defense Communications Agency	117	236	353	114	235	349	114	235	349
National Security Agency	164	859	1,023	195	572	767	195	572	767
Defense Intelligence Agency	305	256	561	321	263	584	298	242	540
Defense Nuclear Agency	120	123	243	116	106	222	92	67	159
Defense Supply Agency	244	19	263	297	21	318	297	21	318
Total, other DOD activities	1,293	1,682	2,975	1,404	1,352	2,756	1,357	1,300	2,657
Other Government agencies (reimbursable):									
Field Activities Administration	1	1	2	4	1	5	4	1	5
U.S. Arms Control and Disarmament Agency	7	2	9	9	2	11	9	2	11
Congressional committee				1		1	1		1
U.S. Coast Guard	10		10	13		13	13		13
Federal Aviation Agency	5		5	10		10	10		10
Maritime Administration	3		3	4		4	4		4
National Aeronautics and Space Administration	22		22	28	10	38	28	10	38
State Department	3	94	97	1	121	122	1	121	122
Veterans' Administration	21	129	150	23	136	159	23	136	159
National Science Foundation				120	741	861	120	741	861
HEW fellowship program	1		1	1		1			
National Aeronautics and Space Counsel				2		2	2		2
Committee on Government Procurement	1		1	1		1			
Panama Canal Company	2		2	2		2	2		2
Selective Service	15		15	9		9	9		9
Special boards and committees	1		1	1		1	1		1
Field Advisory Team Kiel		8	8						
Total, reimbursable	92	234	326	229	1,011	1,240	227	1,011	1,238
Other Government agencies (nonreimbursable):									
National Security Council	0	1	1						
Justice Department	2	0	2	2	0	2	2	0	2
Federal Communication Medical Education for National Defense	2	0	2						
Total, nonreimbursable	4	1	5	2	0	2	2	0	2
Grand total	1,389	1,971	3,306	1,635	2,363	3,998	1,586	2,311	3,897

PERSONNEL ASSIGNED TO ADP ACTIVITIES

Chairman ELLENDER. In the tabulation of special analyses, it is indicated that you contemplate an increase to 4,571 of military personnel assigned to automatic data processing activities from the 4,403 budgeted for fiscal year 1972. The number so assigned for fiscal year 1971 was 4,643. Why this fluctuation, and why the increase in fiscal year 1973?

Admiral BAGLEY. Mr. Chairman, the reduction from fiscal year 1971 to fiscal year 1972 occurred as a result of overall Navy force reductions, as well as the consolidation of some ADP installations. The subsequent increase in fiscal year 1973 is primarily the result of implementing Office of Secretary of Defense's decision of the Worldwide Military Command and Control System computer procurement. I believe it noteworthy that the planned personnel to be assigned in the ADP area as indicated in the fiscal year 1972 President's budget were further reduced 152 personnel in fiscal year 1971 and 235 in fiscal year 1972, as indicated in this budget request.

PERSONNEL ASSIGNED TO INTELLIGENCE ACTIVITIES

Chairman ELLENDER. The table also shows a marked decrease of personnel assigned to intelligence activities. The number listed for fiscal year 1971 is 18,182; for fiscal year 1972, 14,737; and for fiscal year 1973 it is 13,937. Is this reduction entirely a real reduction or are there instances of changes in definition or something similar?

Admiral BAGLEY. Mr. Chairman, these reductions represent actual elimination of military billets during those fiscal years.

PERSONNEL ASSIGNED TO HEADQUARTERS ACTIVITIES

Chairman ELLENDER. Referring to the special analyses section again, I notice that the number of military personnel assigned to headquarters activities will increase in both officer and enlisted categories. Please explain.

Admiral BAGLEY. The increase of 101 between fiscal year 1972 and fiscal year 1973 is a net increase, as you recognize. Basically the increase is attributable to the manpower programed in fiscal year 1973 to accommodate the implementation of the Worldwide Military Command and Control System—WWMCCS. This system required 33 additional officers and 86 enlisted personnel for a total increase of 119. Additionally, 97 billet increases were necessary to provide for the law center functions being organized at the Naval Districts. The one other increase that merits attention is the addition of 22 billets at the Bureau of Medicine and Surgery to improve the Navy's Standard of Service and to provide for overall management of the Drug Rehabilitation program.

The increases cited above account for an increase of 238. The increase cited in the Special Analysis Section amounts to only 101. You can see that there were actually 137 decreases which offset to some extent the 238 increases.

MILITARY PERSONNEL ASSIGNED TO OUTSIDE ACTIVITIES

Chairman ELLENDER. In the tabulation on page 1–66 of the justifications entitled "Military personnel assigned to activities outside the military service" there is a listing of such assignments. Are there any changes of significance that should be brought to the attention of the committee?

Admiral BAGLEY. No, sir.

Senator YOUNG. Generally speaking, what are the functions of enlisted personnel so assigned? I notice that there are 2,311 of them.

Admiral BAGLEY. Mr. Chairman, with the exception of specially required skills at the Defense Nuclear Agency and a few medical repairmen at the Defense Supply Agency activities, the majority of the enlisted personnel perform support duties such as clerical, drafting, cryptology, data processing, et cetera.

TEMPORARY LODGING ALLOWANCE

Chairman ELLENDER. It is my understanding that the General Accounting Office has issued reports critical of the Navy's handling of the temporary lodging allowance in Taipei and in Hawaii. Please describe the nature of this criticism.

Admiral BAGLEY. Yes, sir; the General Acounting Office—GAO—published a report in 1965 on the excessive payment of temporary lodging allowances to uniformed personnel on the Island of Oahu, Hawaii. In this report they alleged that military servicemen in Hawaii had received an estimated $2 to $3 million annually in TLA in excess of the actual above-normal expenses incurred by them while occupying temporary lodgings. The GAO asserted that unrealistically high TLA rates authorized for Hawaii also tend to encourage servicemen to remain in a TLA status longer than necessary. In addition, the Naval Area Audit Service pointed out in 1969 that Navy TLA payments could have been reduced if the Government had provided Navy personnel with temporary lodging through contractor operated hotels or nonappropriated fund mobile homes. In 1970 the Naval Area Audit Service reported that Headquarters, Support Activity, Taipei, Republic of China, needed to improve controls over authorizing departure TLA for Navy personnel incident to permanent change of station from Taiwan to insure that TLA costs were kept to a minimum and were administered as intended by the Joint Travel Regulations.

Chairman ELLENDER. Indicate the position of the Navy on this matter and what remedial action is being taken if the Navy concurs in the findings.

Admiral BAGLEY. The Navy agrees that a member should not receive temporary lodging allowances that are in excess of his actual above-normal expenses. However, in the case of Hawaii the Department of the Navy did not agree that TLA rates were unrealistically high and did not concur in a proposal to revise rates downward. The Navy did concur in the recommendation for a study of the leasing of apartment-hotel accommodations for members on TLA.

In the case of Taipei, administrative procedures were established by the overseas commander to ensure that departure TLA is administered in accordance with the Joint Travel Regulations.

TLA rates and the procedures for administering the TLA program are prescribed by the Per Diem, Travel and Transportation Allowance Committee in the JTR and are equally applicable to all the uniformed services. Administration of the TLA program is the responsibility of the overseas commander. The JTR is currently being revised by the Per Diem, Travel and Transportation Allowance Committee to provide for greater control over TLA by prescribing procedures that will insure that TLA payments more closely equal the more than normal expenses experienced by members in a TLA status. The Navy concurs in principle and supports the proposed revision. The Navy is presently conducting a study to determine the feasibility of reducing TLA costs in Hawaii by providing government leased quarters for members and their dependents arriving for duty.

In addition, emphasis is being placed on housing referral services in overseas areas to assist newly arriving members in finding suitable family housing. This shortens the period of time that a member must occupy temporary accommodations and results in reduced TLA expenditures.

SHIP MANNING LEVEL

Senator YOUNG. I wish you would speak to the ship manning level, its adequacy in numbers and qualification with emphasis on any critical areas.

Admiral BAGLEY. The operating forces afloat have their full complement of officer personnel. We are fleet oriented in our manning policies and we have matched every afloat units needs with regard to numbers. It is not unusual, however, for a lieutenant (junior grade) or an ensign to be utilized in a billet calling for higher grade. This situation does dilute the desired experience level. In the long haul, however, we are hopeful that the resulting overall motivation and full employment principle this provides will outweigh any degrading effects one might expect from a lower experience level. I must emphasize that we do have some experience and skill level problems in the junior officer ranks and we do find doing the job is harder than it used to be, but the positive approaches of fun and zest through responsibility is standing our fleet units in good stead.

Enlisted manning for afloat units is about 96 percent overall. Although senior manning is to allowance, we are short of assistants and trainees. The picture is further complicated by shortages in certain critical rating groups and excesses in other groups. Complexity of our newer ships reduces our capability to substitute one rating for another.

MANNING AIRCRAFT BASES

Senator YOUNG. Also it would be helpful if you would speak to the manning of aircraft bases in the same or similar manner.

Admiral BAGLEY. Yes, sir. The officer manning is at 95 per cent. Some shortages exist at the middle manager level which are satisfied in part by the assignment of junior officers which lowers the experience level.

Enlisted manning of aircraft bases is about 93 percent. Their manning also suffers shortages in the middle pay grades, especially in the critical technical skill areas.

SEABEES

Chairman ELLENDER. Would you please describe the Seabee program for fiscal year 1973, indicating locations, numbers, the type of utilization and any major changes from the previous year.

Admiral BAGLEY. The Seabee program for fiscal year 1973 is a continuation of habitability improvement projects and readiness training. Seabee efforts in habitability improvement are supervision and technical guidance in self-help projects, while readiness training in construction skills contributes toward Navy habitability and operational support involving new construction or major repair.

The habitability improvement program will be pursued at major installations throughout the United States with 17 Naval construction battalion units and other Civil Engineer Corps/Seabee personnel providing the technical guidance. About 1,000 Seabees are involved in this program. Readiness training by naval mobile construction battalions will be conducted overseas by the continued construction of a naval communication station on the island of Diego Garcia and a new construction or major repair at Okinawa, Guam, Puerto Rico, Antarctica, and Rota, Spain. From these main deployment sites, other locations are supported in their respective geographic regions.

The 10 Naval mobile construction battalions currently established deploy from three homeports located at Port Hueneme, Calif.; Gulfport, Miss.; and Davisville, R.I. Each battalion generally deploys for 8 months, then returns to its homeport for 6 months of retraining. Nine of our battalions have 21 officers and 562 enlisted personnel each, and the other battalion will be reduced to 17 officers and 226 enlisted personnel by fiscal year 1973. This reduced battalion is planned to be used in support of the Antarctic program.

The only other major change for fiscal year 1973 is that there will be no Naval Construction Force unit in Vietnam for the first time in over 7 years.

PAY ACT INCREASES

Chairman ELLENDER. Would you please provide a tabulation that will indicate the effective date and cost of all Pay Act increases in fiscal years 1971, 1972, and 1973?

Admiral BAGLEY. Yes, sir.

(The information follows:)

[Amounts in thousands]

	Fiscal year—		
	1971	1972	1973
Public Law 91-231, effective Jan. 1, 1971	$207,600		
Public Law 92-129, effective Nov. 14, 1971		$341,329	$533,300
Public Law 92-210, effective Jan. 1, 1972		137,911	274,949

MILITARY MISSION PERSONNEL

Chairman ELLENDER. Please indicate the number of military mission personnel you are budgeting for in fiscal year 1973 and the total cost of such.

Admiral BAGLEY. There are 340 military mission personnel for a total cost of $4,150,000 in the fiscal year 1973 budget. This excludes 3,529 personnel assigned to advisory duty in Vietnam at a cost of $32,765,000.

CHANGES IN PERSONNEL STRENGTH

Chairman ELLENDER. As you have in the past, would you please provide the committee with a step-by-step tabulation of all major changes in personnel strength in the past year?

Admiral BAGLEY. Yes, sir; we planned to begin fiscal year 1972 with an end strength of 623,023. Consistent within fiscal constraints and other determinations by the Office of the Secretary of Defense, it is planned that Navy end-strength for fiscal year 1972 will be 602,196, a reduction of 20,827 personnel. This includes approximately 9,200 less personnel as a result of Presidential decisions to incrementally withdraw forces from RVN. Further, a reduction of 1,346 end-strength in the areas specifically cut by Congress—Intelligence, Headquarters, and so forth—has been accommodated. The remainder of the reduction, about 10,000 end-strength, generally represents the operational and support personnel associated with a force level cut of about 50 ships from the active fleet.

CHANGES IN FORCE STRUCTURE

Senator YOUNG. What changes in force structure have been programed for fiscal year 1973?

Admiral BAGLEY. Navy plans a total of 657 active fleet ships for fiscal year 1972 and will reduce this number to 594 for fiscal year 1973, a net reduction of 63 ships. The total active aircraft for Navy for fiscal year 1972 is 7,116. A planned reduction of 162 for fiscal year 1973 will reduce this total of active aircraft down to 6,954.

AUTHORIZED STRENGTH

Chairman ELLENDER. Please indicate the authorized strength for fiscal year 1972 and the attainment of that strength.

Admiral BAGLEY. Authorized strength for fiscal year 1972 is 602,196. It is presently planned to attain that strength.

SERVICE REQUEST FOR 1973

Chairman ELLENDER. Please provide the committee with a statement describing the original request made by the department for fiscal year 1973 for this appropriation together with any guidelines preimposed.

Admiral BAGLEY. Yes, sir.

(The information follows:)

	Fiscal year—		
	End strength	Man-years	Amount (millions)
Original request	605,788	604,667	[1] $5,138.2
Reductions	−4,116	−3,483	[1] −60.4
OSD approved	601,672	601,184	[1] 5,077.8

[1] These dollars exclude the Jan. 1, 1972, pay raise.

There were no specific Office of the Secretary of Defense (OSD) guidelines as to the total number of military end strength and supporting funds which could be requested. However, an overall limitation was placed on the total dollars which could be included for all appropriations in the total Navy budget.

REIMBURSABLE PROGRAM

Chairman ELLENDER. Would you please provide an itemized list of those personnel who in fiscal year 1973 will participate in reimbursable programs?

Admiral BAGLEY. Yes, sir.

(The information follows:)

Agency	Officer	Enlisted	Total
Field Activities Administration	4	1	5
U.S. Arms Control and Disarmament Agency	9	2	11
Congressional committee	1	----------	1
U.S. Coast Guard	13	----------	13
Federal Aviation Agency	10	----------	10
Maritime Administration	4	----------	4
National Aeronautics and Space Administration	28	10	38
State Department	1	121	122
Veterans' Administration	23	136	159
National Science Foundation	120	741	861
National Aeronautics and Space Council	2	----------	2
Panama Canal Company	2	----------	2
Selective Service	9	----------	9
Special boards and committees	1	----------	1
Total reimbursable	227	1,011	1,238

REPROGRAMING OF FUNDS

Chairman ELLENDER. As is customary, would you provide a summary of all reprograming of funds for the past year?

Admiral BAGLEY. We have Office of the Secretary of Defense approval for reprograming of $44.8 million into the "Military Personnel, Navy" appropriation for permanent change of station travel. This reprograming has been forwarded to the Congress for your consideration and approval.

SUPPORT OF FREE WORLD FORCES

Chairman ELLENDER. Are any funds included for fiscal year 1973 for the support of free world forces in this appropriation?

Admiral BAGLEY. Yes, sir; we have $1,241,000 included for that purpose.

PROJECT 100,000

Senator YOUNG. Please address yourself to any changes that have taken place in project 100,000 in the past year, including a description of what the project is attempting to accomplish and the effect, if any, that the introduction of the concept has had on the service.

Admiral BAGLEY. Project 100,000 was a program developed by the Department of Defense (DOD) in 1966 to accept men for military service who previously would have been disqualified under existing mental and physical standards. DOD lowered enlistment standards to include men scoring as low as 10 on the Armed Forces Qualification Test (AFQT), provided for enlistment of men having specific medically remedial (MREP) disabilities, and set quotas for these new standards accessions (NSA) as well as other AFQT mental group IV personnel.

Our experience with the project 100,000 personnel who experienced high loss rates due to unsuitability and disciplinary causes, raised a serious doubt as to the efficiency of recruiting them—this would be even more apparent in a smaller Navy where a higher quality four is demanded.

In compliance with the provisions of section 744 of Public Law 92–204, all Office of Secretary of Defense mental group quotas have been canceled, thus effectively eliminating the project.

FLIGHT WAIVER PROVISION

Chairman ELLENDER. Please describe the flight waiver provision program, including the categories under which the program operates and the number of personnel in these categories.

Admiral BAGLEY. I would be happy to do so. The flight waiver provision program is currently undergoing a major revision in order to comply with section 715 of the 1972 Defense Appropriations Act—Public Law 92–204. At the present time, flight waivers are broken down into two broad categories: Those waivers which entitle a person to incentive pay without performing hazardous duty in accordance with congressional legislation and the Department of Defense pay manual, and those waivers which allow an officer to be excused from annual Navy flying minimums while still required to fly for pay purposes.

The first category of waivers include the following:

(1) Those Naval officers aeronautically designated 15 years or longer.

(2) Those naval officers assigned to a course or consecutive courses of instruction calculated to be of 90 days duration or longer.

(3) Those officers whose particular duty assignment outside the United States or in Alaska make it impractical to participate in regular aerial flights in accordance with the Department of Defense pay manual.

The second category of waiver is provided for those officers assigned to duties within the continental limits of the United States or in Hawaii whose duties or availability of aircraft make it impractical to meet annual Chief of Naval Operations flight minimums. Since there are no provisions in the Department of Defense pay manual at this time which entitle these people to incentive pay without performing hazardous duty, they are required to fly for pay purposes even though they are excused from meeting the normally higher Chief of Naval Operations pilot minimums. This waiver is granted upon request by the Chief of Naval Operations if appropriately justified.

As of February 1972 there were 5,131 people so involved as follows:

(1) Those officers aeronautically designated for 15 years or longer

total 4,343. This includes 599 officers so designated who are not required to fly for pay purposes and are not permitted to fly for individual proficiency but who are flying in an operational flying assignment.

(2) Those officers assigned to a course or consecutive courses of 90 days duration or longer total 638. This does not include 164 officers in school who have been aeronautically designated for 15 years or longer.

(3) Those officers assigned to duties outside the United States or in Alaska when it is impractical to fly total 34. This figure for fiscal year 1971 was 51 waivers. Total fiscal year 1972 waivers are anticipated to reach that level.

(4) Those officers assigned to duties within the continental limits of the United States and in Hawaii when it is impractical to meet annual Chief of Naval Operations minimum total 116. This figure for fiscal year 1971 was 342 waivers. It is anticipated that total fiscal year 1972 will reach about 300.

Chairman ELLENDER. How do these numbers compare with those who received flight pay under this provision a year ago?

Admiral BAGLEY. The numbers have increased under this expanded flight waiver policy. Last year, for fiscal year 1972 we planned for a total of 3,356 under the flight waiver category. Our current estimate for fiscal year 1972 is now 5,073.

MISSING IN ACTION AND PRISONERS OF WAR

Chairman ELLENDER. For the record provide a tabulation of officers and enlisted personnel who are either missing in action or are prisoners of war.

Admiral BAGLEY. Yes, sir.

(The information follows:)

	MIA	POW
Officers	107	146
Enlisted	7	0
Total (as of Mar. 10, 1972)	114	146

VIETNAM CASUALTIES

Senator YOUNG. For the record, would you please provide a listing of the Vietnam casualties since the inception of the conflict?

Admiral BAGLEY. I will be happy to.

(The information follows:)

Calendar year:	*Killed in action*
1963	3
1964	1
1965	72
1966	119
1967	316
1968	465
1969	287
1970	90
1971	21
1972 (as of Mar. 4, 1972)	2
Total	1,376

ROTATION TO SOUTHEAST ASIA

Senator YOUNG. Last year the rotation policy to Southeast Asia was described in some detail. Has there been any changes to that policy in the interim?

Admiral BAGLEY. Yes, sir. Basically, the rotation policy remains the same except for some officers and enlisted who are departing Vietnam earlier than their normal rotation data due to the current redeployment. One other change is that aircrewmen are limited to a maximum of 13 months' combat exposure in lieu of the 14-month period previously applicable.

FOREIGN CIVILIAN EMPLOYEES

Chairman ELLENDER. Please provide for the record the number of foreign civilian employees paid by your Department and designated by country.

Admiral BAGLEY. I will be happy to.

(The information follows:)

Country	Fiscal year—		
	1971	1972	1973
Total	33,331	30,250	28,295
Australia	298	294	302
Bahrain	.....	25	25
Bermuda	270	263	274
Brazil	2	2	2
Burma	11	.....	.....
Canada	125	150	141
Canal zone	362	307	255
Republic of China	636	587	565
Cuba	948	979	957
Ethiopia	66	63	63
Germany	81	80	80
Greece	94	94	94
Guam	215	427	163
Iceland	545	605	557
India	.....	.....	7
Indonesia	17	20	20
Italy	750	780	777
Japan	10,624	9,831	8,715
Korea	1,024	1,020	1,022
Morocco	588	574	574
Netherlands	2	2	2
New Zealand	14	14	14
Pakistan	.....	.....	8
Philippines	10,594	10,263	9,868
Portugal	28	29	29
Puerto Rico	2	4	4
Ryukyu Island	1,911	1,718	1,711
Spain	1,025	1,046	1,046
Thailand	404	321	321
United Arab Republic	104	102	110
United Kingdom	324	357	357
Republic of Vietnam	2,267	293	222

Chairman ELLENDER. Proceed.

NAVAL RESERVE

READINESS AND UTILITY EMPHASIS

Admiral BAGLEY. With the reduction of active force levels, the Naval Reserve is playing an even more important role than it has in the past. Therefore, there has been renewed emphasis on the readiness and utility of the Naval Reserve.

AIR RESERVE

In the Naval Air Reserve, we have 45 squadrons, 36 of which are sufficiently ready to meet contingency deployment. This is a marked improvement in readiness.

SURFACE RESERVE

In the Surface Reserve we will have, by the end of fiscal 1972, 35 destroyer-type ships and 18 minesweepers; 62 percent of our reserve ships are sufficiently ready to meet contingency deployments. Additionally, our Surface Reserve Force includes a coastal river squadron.

TRANSFER OF OPERATIONAL CONTROL OF RESERVE SHIPS TO FLEET COMMANDERS: MEDITERRANEAN DEPLOYMENT

We have transferred operational control of our reserve ships to the fleet commanders responsible for similar active force units. This has provided more realistic training and improved readiness for the Reserve ships. As an example, we deployed a Reserve destroyer, the U.S.S. *Gearing*, to the Mediterranean for 2½ months last summer with marked success.

Chairman ELLENDER. When this Reserve destroyer was sent to the Mediterranean, were you able to return one of your regular destroyers?

Admiral BAGLEY. No, sir. What we did was deploy the ship and then we airlifted every 2 weeks the Reserve portion of that crew. We airlifted a total of 528 reservists because, if you recall, they only remain on active duty 2 weeks at a time. But we were able to sustain this operation with no loss of effectiveness.

Chairman ELLENDER. Did you do this by air?

Admiral BAGLEY. Yes, sir.

Chairman ELLENDER. That was quite expensive, was it not?

Admiral BAGLEY. Yes, sir. We used the military airlift and we also used our own Naval Reserve pilots and Naval Reserve aircraft for transport.

MODERNIZATION

The fiscal year 1973 Reserve program provides for modernization of the air and surface components and a net increase of five ships.

REORGANIZATION OF SURFACE DIVISIONS

Our Reserve Surface Divisions are undergoing a a major reorganization. We are shifting to a Reserve unit concept. Each division will consist of one or more units with a specific type ship, tactical unit, staff or shore station to augment or man upon mobilization. This will enhance our mobilization capability and increase training effectiveness and esprit in the Surface Reserve.

MANAGEMENT

In Reserve management, I am continuing toward the objectives of my predecessor to strengthen my role as the focal point for all Naval Reserve matters. Reserve coordinators have been established in most major Navy offices to provide greater coordination of Reserve matters in routine planning and budget development. This will marry active and reserve planning, programing and budgeting.

INCREASED READINESS

In summary, the readiness of both the surface and air components of the Naval Reserve have substantially increased and we expect further improvement in fiscal 1973 as we move toward full implementation of the total force concept.

RESERVE PERSONNEL IN PAID STATUS

Chairman ELLENDER. At this point in the record there will appear a tabulation from the justifications entitled, "Reserve personnel in paid status."

(The information follows:)

Pay group	Paid drills	Paid days of active duty for training	Officers or enlisted	Fiscal year 1971			Fiscal year 1972		Fiscal year 1973	
				Begin	Average	End	Average	End	Average	End
A	48	15	Officers	19,577	19,036	19,502	17,899	17,884	18,995	18,993
			Enlisted	107,028	102,119	106,400	103,878	103,878	101,503	101,50
B	24	15	Officers	1,039	1,032	1,061	1,096	1,111		
			Enlisted							
F	0	90–180/300	Enlisted	737	1,451	3,078	6,127	8,170	8,502	9,128
Paid drill training			Officers	20,616	20,068	20,563	18,995	18,995	18,995	18,995
Subtotal			Enlisted	107,765	103,570	109,478	110,005	112,048	110,005	110,631
Total				128,381	123,638	130,041	129,000	131,043	129,000	129,626
D	0	15	Officers	2,800	2,800	2,800	2,800	2,800	2,800	2,800
			Enlisted	542	395	395	550	550	550	550
E	0	30	do							
Paid active duty training only, subtotal			Officers	2,800	2,800	2,800	2,800	2,800	2,800	2,800
			Enlisted	542	395	395	550	550	550	550
Total				3,342	3,195	3,195	3,350	3,350	3,350	3,350
Total paid status			Officers	23,416	22,868	23,363	21,795	21,795	21,795	21,795
			Enlisted	108,307	103,965	109,873	110,555	112,598	110,555	111,181
Total				131,723	126,833	133,236	132,350	134,393	132,350	132,976

SUMMARY OF RESERVE OFFICER CANDIDATE STRENGTH

Chairman ELLENDER. At this point in the record there will appear a tabulation entitled "Summary of Reserve Officer Candidate Strength."

(The information follows:)

SUMMARY OF RESERVE OFFICER CANDIDATE STRENGTHS

[Average numbers]

	1971, actual	1972, estimate	1973, estimate	Plus or minus difference 1973 compared with 1972
Senior NROTC	2,394	2,403	2,481	+78
Scholarship NROTC	4,410	5,476	5,692	+216
ROC	782	767	859	+92
AVROC	586	760	934	+174
OC(W)	20	20	20	
Total	8,192	9,426	9,986	+560

RESERVE COMPONENT PERSONNEL

Chairman ELLENDER. At this point in the record there will appear the tabulation of "Reserve component personnel" by budget accounts.

(The information follows:)

SUMMARY OF OBLIGATIONS

[In thousands]

Budget activity	1971 actual	1972 estimate	1973 estimate	Plus or minus difference 1973 compared with 1972	Justification page
Reserve component personnel	$146,932	$191,130	$216,617	+$25,487	2-10
Reserve officer candidates	9,051	12,694	14,023	+1,329	2-24
Total direct obligations	155,983	203,824	230,640	+26,816	

SUMMARY OF OBLIGATIONS

Chairman ELLENDER. At this point in the record there will appear a summary of obligations for "Reserve Component Personnel."

(The information follows:)

BUDGET ACTIVITY 1: RESERVE COMPONENT PERSONNEL—SUMMARY OF OBLIGATIONS

[In thousands]

Budget project	1971 actual	1972 estimate	1973 estimate	Plus or minus difference 1973 compared with 1972
Reserve personnel training:				
Pay group A	$125,942	$148,123	$158,821	+$10,698
Pay group B	1,402	1,669		−1,669
Pay group D	2,422	2,520	2,596	+76
Pay group F	5,328	27,670	43,491	+15,821
Reserve personnel school training	4,437	2,948	3,212	+264
Reserve personnel special training	2,801	3,136	3,230	+94
Reserve personnel administration and support	4,600	5,064	5,267	+203
Total direct obligations	146,932	191,130	216,617	+25,487

TRAINING, PAY GROUP A

Chairman ELLENDER. For "Training, Pay Group A" the fiscal year 1973 request is for $158,821,000 as compared with the $148,123,000 provided for fiscal year 1972. Please define Pay Group A.

Admiral BAGLEY. The Pay Group A program provides for personnel performing 48 drills per year and receiving 2 weeks of active duty for training.

Chairman ELLENDER. Please justify the increase requested for fiscal year 1973.

Admiral BAGLEY. The increase in Pay Group A was caused primarily by the pay raises of November 14, 1971 and January 1, 1972, an increase in officer man-year average and enlisted drill performance. These increases were partially offset by a decrease in enlisted man-year average and a decrease in clothing. The officer man-year average increased due to the transfer of Pay Group B officers to Pay Group A in fiscal year 1973. Enlisted drill performance is estimated to increase from 86 percent in fiscal year 1972 to 90 percent in fiscal year 1973. There is no overall decrease in enlisted members. However, it is planned to have fewer Pay Group A members and an increase in Pay Group F in fiscal year 1973. The decrease in clothing in fiscal year 1973 is primarily due to additional clothing authorized in fiscal year 1972 for All Volunteer Force.

Senator YOUNG. I wish you would also explain the effect of the proposed increase in officers and the contemplated reduction in enlisted personnel.

Admiral BAGLEY. The programed increase in officers and decrease in enlisted personnel in Pay Group A are the results of transfers to and from other pay groups, not changes in overall balance. The 1,096 officers who currently make up Pay Group B (a 24-drill program) are all scheduled for Pay Group A in fiscal year 1973, inasmuch as the units included therein will require 48 drills per year for training purposes. The decrease of 2,375 enlisted personnel in Pay Group A is the result of the 2,375 increase in the number of enlisted personnel scheduled for formal training in fiscal year 1973 (Pay Group F). The net effect of both these changes will be more training for officer and enlisted personnel and a higher degree of readiness for the Naval Reserve.

TRAINING, PAY GROUP B

Chairman ELLENDER. For "Training, Pay Group B" no funds are requested for fiscal year 1973. For fiscal year 1972 a total of $1,669,000 was provided. Please define Pay Group B.

Admiral BAGLEY. Yes, sir; the Pay Group B program provides for personnel performing 24 drills per year and receiving 2 weeks of active duty for training.

Chairman ELLENDER. I note that the justifications indicate that more extensive training is planned and that that is the reason for the deletion of the request for fiscal year 1973. Please explain this in more detail.

Admiral BAGLEY. The programs involved are all officer training programs. The intensified training provided in Pay Group A vice Pay Group B by the additional 24 drills will permit these officers to improve their units' readiness to meet mobilization requirements. Programs included are Naval Air Systems Command Units; Ships Sup-

ply Officer Divisions; Transportation, Traffic Terminal Management Divisions; and Naval Reserve Ordnance Divisions.

TRAINING, PAY GROUP D

Chairman ELLENDER. For "Training, Pay Group D" the fiscal year 1973 request is $2,596,000 as compared with $2,520,000 for fiscal year 1972. Please define Pay Group D.

Admiral BAGLEY. The Pay Group D program provides 2 weeks active duty for training for members not in a paid drill status.

Chairman ELLENDER. According to the justifications it is planned to maintain this group at the same level as that of last year. Is this correct?

Admiral BAGLEY. That is correct.

Chairman ELLENDER. Are there any changes or other matters you wish to bring to the attention of the committee in regard to this pay group?

Admiral BAGLEY. No, sir.

TRAINING, PAY GROUP F

Chairman ELLENDER. For "Training, Pay Group F" the fiscal year 1973 request is $43,491,000 as compared with $27,670,000 for fiscal year 1972. Please define Pay Group F.

Admiral BAGLEY. This program provides for from 4 to 10 months of initial active duty for training in both the surface and aviation programs. Upon completion of active duty for training, members enlisted under 10 U.S.C. 511d (members without an active duty obligation) are assigned to Pay Group A. Members enlisting under 10 U.S.C. 511b (2 X 6 personnel having an active duty obligation) go to 2 years active duty upon completion of active duty for training. Upon completion of their active duty obligation, they are assigned to Pay Group A and are required to drill for the remainder of their combined active and Reserve obligation.

Chairman ELLENDER. Please justify this increase, including mention of both personnel increases and rate increase.

Admiral BAGLEY. From a personnel standpoint, this increase is required to fill critical vacancies in units of the Selected Reserve. Both existing and foreseeable vacancies in Selected Reserve units are considered in establishing the number of individuals to be trained and the type of training to be received. The rate increase in pay group F is due to the pay raises effective November 14, 1971 and January 1, 1972.

Senator YOUNG. Would you speak to the rate reduction I notice in both "Subsistence of enlisted personnel" and enlisted travel.

Admiral BAGLEY. Yes, sir; the daily ration rate was reduced from $1.52 per day to $1.46 as of January 1, 1972. Fiscal year 1973, therefore, reflects a full year of the lower ration rate. The travel rate is computed separately for 2 X 6 and 4 X 10 personnel, and by surface and aviation. The slight decrease represents an increase in 2 X 6 personnel whose travel rate is lower than the 4 X 10 members. The lower 2 X 6 travel rate results from the fact that their travel to their first permanent active duty station is chargeable to Military Personnel, Navy, while travel of 4 X 10 members is all in an inactive status and is funded from the reserve personnel, Navy appropriation.

Senator YOUNG. Would you describe the activities this group participates in as part of their training?

Admiral BAGLEY. Individuals in this category are all provided basic training which consists of normal recruit training and the skill training required by the specific rating vacancies within selected reserve units.

SCHOOL TRAINING

Chairman ELLENDER. For "School training" for fiscal year 1973 the request is $3,212,000 as compared with $2,948,000 for fiscal year 1972. Please describe what is included in school training.

Admiral BAGLEY. School training includes tours of paid active duty for training as students at regular, associate, refresher, and technical courses of service schools, area schools, unit schools, officer candidate schools, and other installations which provide training applicable to the individual's assignment.

Senator YOUNG. I notice that the numbers you have programed for school training are identical to those programed for last year but that some of the rates have increased. Would you speak to that?

Admiral BAGLEY. Yes, sir; the increased rates in fiscal year 1973 are a result of the pay raises of November 14, 1971 and January 1, 1972.

Chairman ELLENDER. Please define "Clinical clerkship."

Admiral BAGLEY. Prospective medical and dental officers are provided training at naval hospitals in varied aspects of clinical medicine and patient care. They are rotated through operating rooms, orthopedic, anesthesiology, and similar services.

Senator YOUNG. What is done at the Naval Justice School?

Admiral BAGLEY. The Naval Justice School tour is for JAG Corps officers. It provides intensive instruction in fundamental principles of military law and procedure with practical application of those principles to problems inevitably arising in every command in order to assist in the attainment of a high standard of administration of the naval disciplinary system.

Chairman ELLENDER. What is the OOD School?

Admiral BAGLEY. OOD School (Officer of the Deck) is provided to selected Reserve officers who are assigned to Naval Reserve Force ship destroyers, destroyer escorts, and mine warfare ships, and who have not been afforded training comparable to active duty officers assigned to these ships. This training is provided to insure the readiness of the ships' officers to be fully capable of performing all required fleet operations.

Chairman ELLENDER. What is the 3–M maintenance course?

Admiral BAGLEY. The 3–M maintenance course provides maintenance personnel assigned to Naval Air Reserve Force units with the training necessary to organize, supervise, and administer aircraft maintenance departments. It includes instruction in the naval aircraft maintenance program and the naval aviation maintenance and material management system.

Chairman ELLENDER. What is "Accelerated class 'B' "?

Admiral BAGLEY. Accelerated "B" schools provide petty officer reservists with training in their occupational specialties consistent with the continued advances in military technology, modernization of

the tools of naval warfare, and fleet developed techniques. This training is provided to key petty officer leaders assigned to units of the Selected Reserve.

SPECIAL TRAINING

Chairman ELLENDER. For "Special training" the fiscal year 1973 request is $3,230,000 as compared with $3,136,000 for fiscal year 1972. Please describe "Special training."

Admiral BAGLEY. Special training provides practical instruction or training in selected special programs other than tours included in the school training project. These include the staff and faculty for schools; special field, fleet, and joint exercises, indoctrination; training; promotion or policy boards; and administrative support of training programs.

Chairman ELLENDER. The number of personnel involved in both fiscal years 1973 and 1972 is identical, the rate of pay being the cause of the increase in cost. Is that correct?

Admiral BAGLEY. Yes, sir.

Senator YOUNG. What is the reference to "Seminar Administrators"?

Admiral BAGLEY. Seminar administrators are those officers and enlisted support personnel who staff and provide administrative assistance for National Security Seminars (presented by the Industrial College of the Armed Forces) and Naval Research Reserve Scientific Seminars.

Chairman ELLENDER. What is the Precruise conference, costing $25,280?

Admiral BAGLEY. Precruise conferences provide appropriate Selected Reserve officers assigned to Naval Reserve force ships the opportunity to properly plan with active duty counterparts intrasquadron and intradivision coordinated ship exercises essential to force readiness. The home port dispersion of the ships and aircraft squadrons which comprise the Naval Reserve force mandates proper liaison to support coordinated air/surface fleet-type exercises.

Senator YOUNG. Explain "Direct officer appointments" in the context of special tours.

Admiral BAGLEY. Direct officer appointments are provided a general indoctrination course to qualify them for service in Selected Reserve units as air intelligence officers. This course is conducted at Lowry Air Force Base, Denver, Colo.

Chairman ELLENDER. What is meant by "Indoctrination team"?

Admiral BAGLEY. The mission of the indoctrination team is to counsel aviation personnel being separated from active duty concerning the Naval Air Reserve program to insure that they are given the opportunity to further serve the Navy as members of Selected Reserve units.

ADMINISTRATION AND SUPPORT

Chairman ELLENDER. For "Administration and support" the fiscal year 1973 request is for $5,267,000 as compared with $5,064,000 for fiscal year 1972. Please indicate the costs borne by this budget project.

Admiral BAGLEY. This activity provides for the pay and allowances, permanent change of station travel, and group life insurance of cer-

tain designated Naval Reserve officers on active duty. These officers participate in the preparation and administration of policies and regulations affecting the Reserve component. They are stationed in approximately 31 different locations at selected headquarters activities and in the Washington area. In addition, this activity funds the costs of death gratuities and disability and hospital benefits for both officer and enlisted members.

Chairman ELLENDER. The increase in the request is due to pay raises, is it not?

Admiral BAGLEY. Yes, sir.

Chairman ELLENDER. How many officers are engaged in this activity?

Admiral BAGLEY. There are 226 officers who are funded under this activity.

Chairman ELLENDER. Are there any enlisted personnel?

Admiral BAGLEY. There are no enlisted members included in this activity.

Chairman ELLENDER. Regardless of where they are funded, how many civilians are associated with the Reserve program?

Admiral BAGLEY. It is estimated that in fiscal year 1972 there will be 2,518 civilians who support the Naval Reserve program, and 2,651 in fiscal year 1973.

ATTENDANCE

Senator YOUNG. What has been the record in the past year of attendance in the Reserve?

Admiral BAGLEY. Drill performance for fiscal year 1972 through December for the 48 drill category has been 92.4 percent for surface officers, 91.1 percent for aviation officers, 73.9 percent for surface enlisted and 81.9 percent for aviation enlisted.

Senator YOUNG. Is this similar to what it has been in the past several years?

Admiral BAGLEY. The performance for surface officer and enlisted is basically similar to prior years. The aviation program for both officers and enlisted, however, has shown an increase in fiscal year 1972 over the past 2 years.

CHANGES IN PERSONNEL STRENGTH

Chairman ELLENDER. Please provide a step-by-step tabulation of all major changes in personal strength in the past year.

Admiral BAGLEY. Yes, sir.

(The information follows:)

Month	Total	Officer	Enlisted
January 1971	119,438	20,036	99,402
February 1971	123,009	20,306	102,793
March 1971	127,343	20,429	106,914
April 1971	129,849	20,570	109,279
May 1971	130,680	20,682	109,998
June 1971	130,041	20,563	109,478
July 1971	127,558	18,950	108,608
August 1971	126,417	19,088	107,329
September 1971	123,632	19,044	104,588
October 1971	121,407	18,827	102,580
November 1971	120,562	19,150	101,412
December 1971	120,785	19,700	101,085
Preliminary, January 1972	120,895	19,890	101,005

Senator YOUNG. Would you compare the state of readiness of the Naval Reserve today with that of several years ago?

Admiral BAGLEY. Today's Naval Reserve is vastly improved over that of several years ago, both in material and personnel readiness. Older, inadequate ships have been replaced with modernized, fleet-compatible ships operating directly under fleet commanders. Similarly, modern, fleet-capable aircraft are being supplied to restructured, fleet-size air squadrons. As a result, 36 of 45 reserve squadrons are now fleet-ready, with eight of the remainder undergoing transition to newer aircraft.

An increased availability of rate-training for Reserve personnel plus a programed infusion of hardware to equip combat units is enhancing general morale and readiness.

EFFECT OF ALL-VOLUNTEER FORCE

Senator YOUNG. Last year the witness indicated that a zero draft environment would have deleterious effect on the Reserve unless incentives were provided. What in your opinion is the outlook at this time and in the future?

Admiral BAGLEY. We believe it will be difficult to maintain the authorized average strength in the Naval Reserve in a zero draft and all-volunteer force environment. There are a number of factors which affect our ability to attract and retain Reserve forces such as compensation, training equipment, attitude of the public and citizen sailor toward military life, to name a few. The recent pay raises may have a beneficial effect; however, additional incentives probably will be required if we are to recruit and retain a sufficient number of personnel to maintain authorized strengths in the Reserve.

PAY COST INCREASES

Chairman ELLENDER. Please describe the effect of recent pay cost increases on this budget.

Admiral BAGLEY. The pay raise of November 14, 1971 is estimated to cost $26,978,000 and the increase of January 1, 1972 is estimated at $12,440,000 for a total of $39,418,000 in fiscal year 1973 for the two pay raises. These raises will require supplemental funding of $21,033,000 for fiscal year 1972.

REPROGRAMING OF FUNDS

Chairman ELLENDER. Has there been any significant reprograming of funds to or from this appropriation in the past year?

Admiral BAGLEY. No, sir.

ACTIVE DUTY PERSONNEL

Chairman ELLENDER. How many officers and enlisted personnel on active duty are engaged in training and supporting the Reserve?

Admiral BAGLEY. It is estimated that in fiscal year 1972, there will be 1,503 officers and 16,349 enlisted members who are needed to support the Naval Reserve. In fiscal year 1973, the estimated numbers are 1,496 officers and 16,650 enlisted members.

ACTIVE DUTY FOR OTHER THAN TRAINING

Chairman ELLENDER. Please list any instances in the past year when members of the Reserve have been called to active duty for purposes other than training.

Admiral BAGLEY. In the past year, there have been no instances where members of the Naval Reserve have been called to active duty for purposes other than for training.

SERVICE REQUEST FOR FISCAL YEAR 1973

Chairman ELLENDER. I wish you would provide for the use of the committee a statement describing the original request made by the Reserve for fiscal year 1973 together with any preimposed guidelines.

Admiral BAGLEY. We requested $213,529,000 from the Department of Defense and $230,640,000 was approved. We were granted an additional $12,440,000 for the January 1, 1972 pay raise and $3,200,000 to increase our enlisted drill performance from 85 to 90 percent. Additionally, we received an increase of $3,359,000 to fund the increased cost of NROTC subsistence allowance from $50 to $100 monthly and to support an additional 500 begin strength in scholarship NROTC. These increases were partially offset by reductions in the senior ROTC and Reserve officer candidate/aviation, Reserve officer candidate program, as well as reduced Government contributions for Servicemen's Group Life Insurance. The original request was not specifically controlled by the Secretary of Defense, but was determined by Navy within total planned Navy resources allocated by the Secretary of Defense.

RESERVE OFFICER CANDIDATES

Chairman ELLENDER. At this point there will appear a tabulation of Reserve officer candidates by budget project.

(The information follows:)

BUDGET ACTIVITY 2: RESERVE OFFICER CANDIDATES—SUMMARY OF OBLIGATIONS

[In thousands]

Budget project	1971 actual	1972 estimate	1973 estimate	±difference 1973 compared with 1972
Senior Reserve Officers' Training Corps	$1,762	$1,344	$1,064	−$280
Scholarship program	5,301	8,576	9,119	+543
Junior NROTC program	540	550	1,104	+554
Reserve officer candidates	1,448	2,224	2,736	+512
Total direct obligations	9,051	12,694	14,023	+1,329

SUMMARY OF RESERVE OFFICER CANDIDATE STRENGTH

Chairman ELLENDER. At this point in the record there will appear a summary of Reserve officer candidate strength.

(The information follows:)

SUMMARY OF RESERVE OFFICER CANDIDATE STRENGTHS

[Average numbers]

	1971 actual	1972 estimate	1973 estimate	± difference 1973 compared with 1972
Senior NROTC	2,394	2,403	2,481	+78
Scholarship NROTC	4,410	5,476	5,692	+216
ROC	782	767	859	+92
AVROC	586	760	934	+174
OC(W)	20	20	20	
Total	8,192	9,426	9,986	+560

SENIOR OFFICERS' TRAINING CORPS

Chairman ELLENDER. For the "Senior Officers' Training Corps" the fiscal year 1973 request is for $1,064,000 as compared with $1,344,000 for fiscal year 1972. Describe what is covered in this project.

Admiral BAGLEY. The budget project "Senior Officers' Training Corps" provides for the costs for members of the Senior (contract) NROTC program as follows: Upon enrollment in the program, a member is issued a uniform; he receives a subsistence allowance of $100 per month for 20 months (junior and senior years); he participates in a summer at-sea training period following his junior year for which he is paid at the rate of one-half an O–1, and receives subsistence in kind, an organizational uniform, and travel. Tuition, textbooks, and other administrative fees are at the expense of the member. Upon graduation he is commissioned an ensign, USNR, and is obligated to serve 3 years active duty and 3 years inactive duty.

Chairman ELLENDER. Please explain the reduction in number for fiscal year 1973.

Admiral BAGLEY. This reduction was brought about by the transfer of a substantial number of already enrolled senior students to scholarship status during the 1971–72 school year. Additionally, senior students (nonscholarship) enrollment dropped during the anti-NROTC fiscal years of 1969, 1970, and 1971.

Chairman ELLENDER. Also explain the changes in rates, some of which are increased and others of which have been reduced.

Admiral BAGLEY. The rates for subsistence allowance are higher in fiscal year 1973 due to a full year of the increased rate of $100 per month vice $50 per month authorized by Public Law 92–171 and effective November 14, 1971. The decrease in pay and allowances and subsistence rates resulted from fewer planned days for summer training. The lower rate for travel is caused by variations in distances to places to which midshipmen will travel to perform summer cruises.

SCHOLARSHIP PROGRAM

Chairman ELLENDER. For the "Scholarship program" the fiscal year 1973 request is $9,119,000 as compared with the fiscal year 1972 funding of $8,576,000. Please describe the scholarship program.

Admiral BAGLEY. Since 1926 the Naval Reserve Officers' Training Corps has offered an opportunity for young men to qualify for commissions in the U.S. Naval Reserve while attending college. With demands for greater numbers of regular officers following World War II, it was decided to offer commissions in the Regular Navy and Marine Corps to NROTC graduates rather than to establish a second Naval Academy. The NROTC scholarship program was created to implement this decision.

NROTC scholarship students are appointed midshipmen, U.S. Naval Reserve, by the Secretary of the Navy, but commissioned U.S. Navy. Scholarship students are granted the compensations and benefits authorized by law for a period not to exceed 4 years. During these years of college training, the Navy pays 4 years of college tuition, costs of textbooks, fees of an instructional nature, and a subsistence allowance of $100 per month (not to exceed 40 months). During drill periods and summer training periods, midshipmen wear Government-furnished uniforms. In addition, during their summer training periods, they receive midshipmen's pay (same as Naval Academy midshipmen) equivalent to one-half base pay of an O–1 under 2 years. Upon completing the program, the students are commissioned ensigns in the U.S. Navy and incur a minimum of 4 years active obligated service.

Senator YOUNG. Would you discuss the number of personnel involved with particular emphasis on any relationship with the previous program?

Admiral BAGLEY. Yes, sir. Title 10, United States Code, section 103, increased the Navy ceiling for the scholarship NROTC program from 5,500 to 6,000. Senior students already in the program were transferred to the scholarship program during the 1971–72 school year. This action has resulted in increased numbers in the scholarship program and a decrease in the senior program for fiscal year 1972. Both programs will be increased in fiscal year 1973.

Senator YOUNG. I wish you would address your comments to the rate changes in this project.

Admiral BAGLEY. The higher subsistence allowance rate resulted from a full year implementation of Public Law 92–171 which increased the monthly subsistence allowance rate from $50 to $100 effective November 14, 1971. The increased travel rate is due to the variation in distances for summer training cruises. The decrease in pay and allowances and subsistence rates is a result of fewer planned days for summer training.

JUNIOR RESERVE OFFICERS' TRAINING CORPS

Chairman ELLENDER. For the "Junior Reserve Officers' Training Corps" the fiscal year 1973 request is for $1,104,000 as compared with an appropriation of $550,000 for fiscal year 1972. Describe the content of this program and the utilization of funds.

Admiral BAGLEY. The Junior Reserve Officers' Training Corps is a Navy-sponsored citizenship program at the secondary school level. The program was established by title 10, United States Code, section 102. It is conducted at fully accredited and Navy-selected schools. Senior high schools provide a Navy-approved program of instruction taught by recently retired Navy and Marine Corps personnel. The instructors'

salary expense is shared equally by the Navy and the school. Only the cost of uniforms is funded under the "Reserve personnel, Navy," appropriation.

Chairman ELLENDER. I note an anticipated increase from 3,986 in 1972 to 8,000 in 1973. Please explain this marked increase.

Admiral BAGLEY. The increased numbers reflect additional requirements for uniforms for the 53 new units planned for fiscal year 1973.

Chairman ELLENDER. Do you anticipate having no trouble reaching the estimate?

Admiral BAGLEY. We do not anticipate any trouble.

Chairman ELLENDER. Is there a point beyond which you do not expect to expand further?

Admiral BAGLEY. Yes, sir. The congressional ceiling for the Department of the Navy has been established at 275 units. Of this number, the Navy has been allocated 233 units and the Marine Corps 42 units. The Navy expects to reach the allocated number of 233 units consisting of approximately 29,000 members in fiscal year 1974.

Senator YOUNG. Describe generally the attitudes experienced in these juniors.

Admiral BAGLEY. Mr. Chairman, we are very proud of our NJROTC units and look forward to expanding our program in fiscal year 1973. Reports received from school officials and community leaders in various parts of the country indicate that these young people are eagerly participating in the program and are demonstrating generally high levels of leadership, integrity, responsibility, and patriotism. Additionally, about 25 percent of last year's graduates are participating in various programs of the military services.

Chairman ELLENDER. Indicate how costs other than uniforms are funded and the magnitude of these.

Admiral BAGLEY. Other costs for the Junior Reserve Officers Training Corps are funded through the "Operation and Maintenance, Navy" appropriation. The fiscal year 1973 congressional budget request for NJROTC is $1.4 million. These funds are primarily for instructor salaries, textbooks and references, drill rifles, field trips, and other miscellaneous supplies and material.

Chairman ELLENDER. How many officers, enlisted personnel and civilians are involved in this program?

Admiral BAGLEY. We have 119 retired officers and 147 retired enlisted involved in this program.

NROTC NEW UNITS

Senator YOUNG. Do you have programed the inclusion of any new NROTC units for fiscal year 1973?

Admiral BAGLEY. No, sir.

NROTC WITHDRAWALS

Senator YOUNG. Have there been any NROTC withdrawals in the past year?

Admiral BAGLEY. No, sir.

Senator YOUNG. Please list the colleges and universities that have withdrawn previously from the NROTC program.

Admiral BAGLEY. Yes, sir. The unit at Harvard was disestablished June 30, 1971.

STUDENT OPPOSITION

Senator YOUNG. Has there been any student opposition voiced to the NROTC program in the past year?

Admiral BAGLEY. It is significant to note that NROTC and the military services are not in trouble today as was the case 2, 3, or 4 years ago. No college or university has requested withdrawal of NROTC since October 1970. We are not aware of any demonstrations or disruptions against NROTC during the academic year 1971–72. We believe the pendulum is swinging back; more universities are requesting ROTC units and more students are applying for the scholarship program.

PERSONNEL AND APPROPRIATION REQUIREMENTS

I will now outline our specific fiscal 1973 personnel requirements and associated MPN and RPN appropriation requests.

MILITARY PERSONNEL NAVY

An MPN appropriation of $5,352,749,000 is requested to support a fiscal year 1973 end strength of 601,672.

Chairman ELLENDER. Is that for pay alone?

Admiral BAGLEY. That is for pay and allowances, the bonuses for reenlistment, for uniforms, for all of those types of personnel related items. It is a very large figure.

Chairman ELLENDER. It surely is.

Admiral BAGLEY. This is a $270.1-million increase over fiscal 1972 to support a near level end strength—524 reduction. The dollar increase is due primarily to pay increases.

Chairman ELLENDER. You mean the reduction was only 524?

Admiral BAGLEY. In our end strength between fiscal 1972 and fiscal 1973. This dollar increase is due primarily to pay increases.

6-YEAR COMPARISON OF STRENGTHS AND COST

Chairman ELLENDER. What is the cutback from 1971 to 1973? And if you don't have that available——

Admiral BAGLEY. I don't have the 1971, sir.

Chairman ELLENDER. I wish you would put in the record the difference in appropriation, let us say, for the last 6 years.

ADMIRAL BAGLEY. For both the strength and the cost?

Chairman ELLENDER. That is right.

Admiral BAGLEY. All right, sir.

(The information follows:)

TABLE OF STRENGTH AND COST DIFFERENCES

	End strength	Amount (thousands)	Difference from prior year	
Fiscal year:				
1972	602,196	$5,082,611	−20,827	+$371,292
1971	623,023	4,711,319	−69,412	−142,641
1970	692,435	4,853,960	−83,209	+398,760
1969	775,644	4,455,200	+10,412	+297,432
1968	765,232	4,157,768	+13,838	+233,569
1967	751,394	3,924,199	+6,414	+337,542

MANPOWER REDUCTION IMPERATIVE

Chairman ELLENDER. I am convinced that in order to obtain any real savings in the Defense budget, we are going to have to have substantial decreases in the size of the military services. The increases in military pay in recent years have been so great that we are now spending about 56 percent of the Defense budget for manpower related costs. This does not leave very much for operations, procurement, and research and development.

Admiral BAGLEY. It is a very difficult area, sir, and I certainly agree with you.

Chairman ELLENDER. We are carrying a very heavy burden at the moment. Our debt is increasing by leaps and bounds. As I have remarked on several occasions, when I first came to Washington 35 years ago to attend the 75th Congress—which was my first term in the Senate—for the first 2 years we appropriated about $19.5 billion to pay every department of Government, and pay interest on our debt. Today the interest alone on our debt is about $22 billion. In other words, today the interest on the debt costs $3 to $4 billion more than it cost to run the whole Government when I first came here. So you can see what is happening. Each year our deficit is growing larger. By the end of the present administration our debt will be in excess of $480 billion. It might be as much as a half trillion dollars by the end of 1973.

Admiral BAGLEY. It is an enormous sum, sir.

Chairman ELLENDER. It is an enormous sum. You can take 5 percent of that as an average interest rate and see that the interest rate alone will be over $25 billion that we must find somewhere to pay the interest to those who hold these bonds of ours. I hope there will be a change. Proceed.

RESERVE PERSONNEL, NAVY

Admiral BAGLEY. An RPN appropriation of $230,640,000 is requested to support an average Selected Reserve strength of 129,000, plus 3,350 reserve personnel in nondrill pay status. This represents a $26.8 million increase over fiscal 1972 to support a level strength. Again, pay increases are primarily responsible for the dollar increase.

Mr. Chairman, that concludes my formal testimony. I would be happy to try to answer any further questions.

MILITARY PERSONNEL OPTIONS

Chairman ELLENDER. Please provide for the record a tabulation of all the options available to military personnel (both officer and enlisted) when they are in receipt of permanent change of station orders, that is, swaps, execution of the orders, resignation from the service, et cetera.

Admiral BAGLEY. I shall be glad, Mr. Chairman, to furnish this information.

(The information follows:)

OFFICER OPTIONS

1. Personnel eligible for retirement may request retirement in lieu of complying with Permanent Change of Station orders. They must so advise the Chief of Naval Personnel by message within ten days of receipt of their Permanent Change of Station orders.
2. Officers who have humanitarian considerations may submit request for a humanitarian assignment.
3. Reconsideration of an officer's Permanent Change of Station assignment may be requested.

ENLISTED OPTIONS

1. Formally request cancellation or modification. This may be initiated by the individual or the command.
2. Request cancellation for humanitarian reasons.
3. Request transfer to the Fleet Reserve or the Retired List if eligible.
4. Request self-negotiated exchange of assignment.
5. Request/volunteer for another assignment in lieu of orders in hand.
6. Reclama the assignment through appropriate command channels.
7. The individual may decline to obligate if insufficient obligated service remains for assignment.

SUBCOMMITTEE RECESS

Chairman ELLENDER. I have no further questions.

The subcommittee will stand in recess until tomorrow at 10 o'clock.

Admiral BAGLEY. Thank you very much, Mr. Chairman.

(Whereupon, at 1:02 p.m., Tuesday, February 22, the subcommittee was recessed, to reconvene at 10 a.m., February 23.)

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1973

WEDNESDAY, MARCH 1, 1972

U.S. SENATE
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee continued in meeting at 11 a.m., in room S–126, the Capitol, Hon. Allen J. Ellender (chairman) presiding.

Present: Senators Ellender, Young, Allott, Case; also present, Senator Hollings.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE NAVY

OPERATION AND MAINTENANCE, NAVY

STATEMENT OF VICE ADM. C. S. MINTER, JR., USN, DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)

ACCOMPANIED BY:

VICE ADM. G. M. DAVIS, USN, CHIEF, BUREAU OF MEDICINE AND SURGERY

VICE ADM. F. J. HARLFINGER, USN, DIRECTOR, COMMAND SUPPORT PROGRAMS, OFFICE OF THE CHIEF OF NAVAL OPERATIONS

REAR ADM. K. R. WHEELER, SC, USN, COMMANDER, NAVAL SUPPLY SYSTEMS COMMAND

REAR ADM. N. SONENSHEIN, USN, COMMANDER, NAVAL SHIP SYSTEMS COMMAND

REAR ADM. V. G. LAMBERT, USN, DEPUTY DIRECTOR OF EDUCATION AND TRAINING, OFFICE OF THE CHIEF OF NAVAL OPERATIONS

REAR ADM. D. G. PLATE, USN, DEPUTY CHIEF OF NAVAL PERSONNEL

REAR ADM. S. H. MOORE, USN, DIRECTOR OF BUDGET AND REPORTS, OFFICE OF THE NAVY COMPTROLLER

REAR ADM. R. E. SPREEN, USN, DIRECTOR, INFORMATION SYSTEMS DIVISION, OFFICE OF THE CHIEF OF NAVAL OPERATIONS

REAR ADM. J. M. BARRETT, USN, DEPUTY CHIEF OF NAVAL MATERIAL PROGRAMS AND FINANCIAL MANAGEMENT

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ACCOMPANIED BY—Continued

REAR ADM. E. L. FEIGHTNER, USN, ASSISTANT COMMANDER FOR LOGISTICS/FLEET SUPPORT, NAVAL AIR SYSTEMS COMMAND
REAR ADM. J. B. JOHNSON, USNR, ASSISTANT DEPUTY CHIEF OF NAVAL OPERATIONS (NAVAL RESERVES)
REAR ADM. T. J. CHRISTMAN, USN, DEPUTY COMMANDER, NAVAL ORDNANCE SYSTEMS COMMAND
CAPT. E. C .SMITH, USN, DIRECTOR, PETROLEUM AND OIL SHALE RESERVES
CAPT. C. C. BROCK, USN, DIRECTOR, FISCAL MANAGEMENT DIVISION, OPNAV
CAPT. P. F. KENNEDY, SC, USN, COMPTROLLER, NAVAL ELECTRONICS SYSTEMS COMMAND
CAPT. R. BOYKIN, USN, HEAD, OPERATIONS BRANCH, FISCAL MANAGEMENT DIVISION, OPNAV
CAPT. D. W. ABERCROMBIE, USN, ASSISTANT FOR FIELD SUPPORT, OFFICE OF THE CHIEF OF NAVAL OPERATIONS
CAPT. R. S. BAIRD, SC, USN, COMMANDING OFFICER, NAVAL FINANCE CENTER, CLEVELAND, OHIO
CAPT. C. H. TISDALE, JR., USN, BUDGET AND OVERHAUL SCHEDULE BRANCH, OFFICE OF THE CHIEF OF NAVAL OPERATIONS
COL. D. E. BJORKLUND, USMC, O. & M., N SECTION, AVIATION PLANS AND REQUIREMENTS DIVISION, OPNAV
LT. COM. C. T. BOYLAN, SC, USN, ASSISTANT TO DCNO (LOGISTICS)
C. H. CLARK, OFFICE OF THE NAVY COMPTROLLER
B. H. KAHN, DIRECTOR, PLANS & PROGRAMS, SSPO
A. YANNELLA, DIRECTOR, SECRETARY OF NAVY STAFF, FISCAL AND NAVY COMPTROLLER, ADMINISTRATIVE DIVISION

Chairman ELLENDER. The next appropriation to be considered will be "Operation and Maintenance, Navy," for which the fiscal year 1973 estimate is $5,134,568,000. The appropriation for fiscal year 1972 was approximately the same amount, $5,098,145,000, which includes $73,748,000 for the January 1, 1972, pay raise.

PROGRAM AND FINANCING

At this point in the record there will appear certain program and financing information from the justifications.

(The information follows:)

OPERATION AND MAINTENANCE, NAVY

PROGRAM AND FINANCING (IN THOUSANDS OF DOLLARS)

	1971 actual	1972 estimate	1973 estimate
Program by activities:			
Direct program:			
1. Strategic forces	254,161	277,769	305,179
2. General-purpose forces	1,571,436	1,656,608	1,611,670
3. Intelligence and communications	277,848	296,050	313,569
5. Guard and Reserve	109,876	118,943	136,119
7. Central supply and maintenance	1,912,174	1,913,239	1,859,598
8. Training, medical, and other general personnel activities	530,002	632,241	675,902
9. Administration and associated activities	204,832	176,907	173,834
10. Support of other nations	85,935	73,768	58,697
Total, direct program	4,946,264	5,145,525	5,134,568
Reimbursable (total)	898,647	1,103,663	1,107,790
Subtotal	5,844,911	6,249,188	6,242,358
Intrafund obligations	−431,437	−500,000	−500,000
Total obligations	5,413,474	5,749,188	5,742,358
Financing:			
Receipts and reimbursements from—			
Federal funds	−410,659	−543,663	−547,790
Trust funds	−15,977	−16,000	−16,000
Non-Federal sources [1]	−40,574	−44,000	−44,000
Unobligated balance transferred from other accounts		−47,500	
Unobligated balance lapsing	3,213		
Budget authority	4,949,477	5,098,025	5,134,568
Budget authority:			
Appropriation	4,935,618	5,021,740	5,060,820
Transferred to other accounts	−41,075	−120	
Transferred from other accounts	54,934		
Appropriation (adjusted)	4,949,477	5,021,620	5,060,820
Proposed supplemental for wage-board increases		39,000	
January 1972 pay increase supplemental/amendment		37,405	73,748

[1] Reimbursements are principally from sales to commercial enterprises and individuals of goods and services (10 U.S.C. 2481, 7576, 7601, and 7602).

Note: The amounts shown as January 1972 pay increase supplemental/amendment are not distributed to each individual appropriation in the fiscal year 1973 president's budget, but are reflected as a 1-line defense-wide contingency amount. The amounts shown above are estimates, pending final determination of the amounts to be requested when supplemental and amended estimates are formally transmitted.

IMPROVEMENT OF READINESS OF FORCES

Chairman ELLENDER. The principal witness is Vice Adm. Charles S. Minter, Deputy Chief of Naval Operations for Logistics. You may proceed, Admiral.

Admiral MINTER. Thank you, Mr. Chairman, Senator Young, and Senator Allott.

Mr. Chairman and members of the committee, it is an honor to appear before you to present the fiscal year 1973 Operation and Maintenance, Navy program. The major objective supported by this appropriation is the continuation of efforts to improve the material readiness of our reduced forces. Operation and Maintenance funding is vital to our national defense. It buys immediate readiness. The immediate combat readiness of the Navy depends directly on the material reliability and effectiveness of our ships and aircraft.

1972 APPROPRIATIONS AND 1973 BUDGET REQUESTS

The fiscal year 1973 request for operation and maintenance, Navy, is $5,134,500,000. The Congress approved $5,021,700,000 for fiscal year 1972. A proposed supplemental appropriation for $76.4 million for civilian wage increases and a net transfer of $47.5 million for other accounts, establishes the current fiscal year 1972 funding level at $5,145,500,000.

Planned obligations contained in this request are $11 million less than shown for fiscal year 1972. This however does not represent a true program comparison in that unit price increases in fiscal year 1973, total $106.6 million and the full year pay raise cost for graded and ungraded personnel in fiscal year 1973, totals $61.7 million. These unavoidable increases equate to a program reduction of $179.3 million in fiscal year 1973.

SHIP MAINTENANCE

A decrease of $28.3 million in ship maintenance funding is reflected for fiscal year 1973. We plan to overhaul 111 ships, including three ballistic missile submarines, seven nuclear attack submarines, and one *Forrestal* class attack carrier. Included in this total are 16 Naval Reserve training ships.

Reflected in this request is a decrease in ships operating in the active fleet from 657 in fiscal year 1972 to 594 in fiscal year 1973. Some 22 ships are expected to join the Fleet from new construction, conversion, or reconfiguration while 85 older ships will leave the Active fleet. The number of steaming hours supported from operation and maintenance funds is 1.56 million hours, a reduction of 59,000 below fiscal year 1972.

RESERVE (INACTIVE) FLEET

Senator YOUNG. Do you have figures indicating how much it costs each year to maintain the ships the Navy has in mothballs?

Admiral MINTER. In the Reserve Fleet?

Senator YOUNG. Yes.

Admiral MINTER. I do not have it in this statement but I can get it for you. The total cost for the Inactive Fleet, I can get you a figure on that.

Admiral SONENSHEIN. About $6.2 million.

ACTIVE FLEET

Chairman ELLENDER. Admiral, you said that 22 ships will join the fleet and 85 ships will leave the fleet. Are these new ships coming into the fleet?

Admiral MINTER. Of the 22 ships joining the fleet during fiscal 1973, 19 are new ships and three are conversions. As I stated 85 older ships will leave the fleet making a net decrease of 63.

GAINS AND LOSSES BY TYPE

Chairman ELLENDER. Could you provide for the record a list of the gains and losses by types?

Admiral MINTER. Yes, Mr. Chairman. I have that information here, and I will submit it for the record.

(The information follows:)

Fiscal year 1973 deliveries:	
From new construction:	
DE	7
DLGN	1
SSN	3
LSD	1
LST	1
AE	2
AOR	1
ASR	2
ATS	1
Subtotal	19
From conversion:	
DLG	2
AH (reconfiguration)	1
Subtotal	3
Grand total	22
Fiscal year 1973 losses:	
CVS	1
DD	21
DE	6
DLG (to conversion)	2
LCC	1
LPA	1
LST	10
MSO	21
SS	10
AE	1
AG	1
AGF	1
AGSS	1
AO	1
AOG	3
ASR	2
ATF	2
Grand total	85

Senator ALLOTT. I want to be sure I understand this paragraph. The difference between 657 and 594 is 63. Do I understand that 85 older ships, in addition to the 63, will leave the fleet?

Admiral MINTER. No, sir; a total of 85 ships that are now active will leave the fleet. Twenty-two new ships will join the fleet. The difference then of 63 brings us down to 594.

AIRCRAFT OPERATIONS

Aircraft operations funds will support approximately 2.7 million flying hours at a cost of $329.9 million, compared to 2.75 million hours and $329.3 million in fiscal year 1972. The decrease of 47,000 flying hours is primarily due to anticipated reduced SEASIA activity and overall funding constraints. There is a reduction of 59 operating aircraft, from an average 5,868 in fiscal year 1972 to 5,809 in fiscal year 1973. Funding in this area has remained approximately level due to an increased fuel cost and the increased cost of operating a more modern aircraft mix.

SHORE SUPPORT AND PERSONNEL

Related to the reduction in numbers of operating ships and aircraft are decreases in shore support and personnel requirements. Reductions in the base structure result primarily from a smaller force. Other associated reductions are reflected in transportation and supply operations. The number of military personnel to be supported is planned to decrease from an end strength of 602,196 in fiscal year 1972 to 601,672 end strength in fiscal year 1973.

Direct hire civilian employment funded in this appropriation is estimated at 128,554 for end fiscal year 1973. This estimate reflects 1,137 positions for operation of the Naval Training Device Center, Orlando, Fla., which were previously budgeted under the R.D.T. & E. Navy appropriation. Exclusive of this transfer, our net change represents an employment decrease of approximately 1,500 below the end strength level submitted for June 30, 1972. Over a 3-year period, using June 30, 1970, as a base, our direct hire civilian employment will have decreased by approximately 17,000 positions, or 19,800 if adjusted for the transfer of the Naval Training Device Center and specific new requirements submitted for the all-volunteer force and the drug abuse and rehabilitation program.

PROJECT VOLUNTEER

Chairman ELLENDER. I see that you are requesting funds for an additional 106 personnel in the Project Volunteer program. Would you please explain to the committee how much this increase will cost and why these additional personnel are necessary?

Admiral PLATE. The additional 106 civilians will require $945,000. Eighty-two of these are required to implement a management information system. This system will guarantee a specific school assignment for enlistees, resources management information, reserve vacancy data, and general market information for management purposes. The remaining increase of 24 civilians are for improvements to the Naval Reserve, the major portion of which will be used to start mechanization of records for enlisted Reserve personnel.

Chairman ELLENDER. I realize that there will be other increases and decreases relating to Project Volunteer interspersed throughout the re-

quest, so I wonder if you would insert for the record at this point a breakdown of these increases and decreases by budget activity and budget program, showing the amount of each? When we get to them in the justification, I will have some questions, but I think that a summary of these would be appropriate now.

Admiral PLATE. Mr. Chairman, the fiscal 1973 request for O. & M. includes $32.6 million for Project Volunteer, all of which is contained in budget program 8—training, medical, and other general personnel support.

I have a tabulation setting out the details of this program for fiscal years 1972 and 1973, that I can submit for the record if you desire.

Chairman ELLENDER. Yes, please provide that information for the record.

(The information follows:)

	Fiscal year 1972	Increase/ decrease	Fiscal year 1973 request
Recruiting and examining	$7,844,000	+$8,654,000	$16,498,000
Officer procurement	406,000	+436,000	842,000
Service initiatives	14,593,000	+276,000	14,869,000
Other reserve initiatives	0	+400,000	400,000
Total, Navy AVF request	22,843,000	+9,766,000	32,609,000

Senator YOUNG. It would also be appropriate to have your comments on the effect Project Volunteer has had on the Navy in the year that it has been in operation. Please give us an overview of the program.

Admiral PLATE. To date Project Volunteer has contributed to our effort to achieve an all-volunteer force. We have had a major pay raise. We have increased recruiting stations by three main stations, six substations and added 100 new branch stations and 900 new personnel. In addition, we have made many management and facility improvements. Although we are not meeting our recruiting goals, our recruiters have recruited more young men than last year. The initiatives we have taken have contributed to limiting the shortfalls considerably. In addition, we have Project Volunteer assets to improve service at commissaries and medical facilities and have made improvements to bachelor housing and living conditions.

Admiral MINTER. I would like now to present individually the budget request for each of the eight activities of this account. The budget activity structure in this year's request is the same as that in which the 1972 budget was presented with the activities consistent with the Department of Defense's 5-year defense programs.

BUDGET ACTIVITY ONE—STRATEGIC FORCES

The fiscal year 1973 Operation and Maintenance, Navy request for budget activity 1 is $350.2 million, a net increase of $27.4 million over fiscal year 1972. This budget activity finances the operation and maintenance of the Fleet Ballistic Missile System, including the supporting services required to keep this deterrent force constantly ready at a high level of reliability. The Fleet Ballistic Missile System includes 41 missile submarines together with their tenders, support ships, and crews. Funds for this system provide for overhaul of submarines and

support ships, technical and logistic support for the weapon systems, strategic command and control communications, and specialized FBM training functions. In addition, funds in this budget activity support the Naval Space Surveillance System, a component of the North American Air Defense Command.

To date 10 Poseidon submarines have completed conversion. Seven of these have deployed and the remaining three are now in predeployment status but scheduled to deploy in the near future. An additional nine are presently in shipyards undergoing conversion.

Four older Polaris submarines, two of the 598 class and two of the 608 class will commence their second overhaul in fiscal years 1972 and 1973. Five years will have lapsed since their first overhaul.

The increase in funds requested for fiscal year 1973 is due primarily to the attendant cost associated with the overhaul of three Polaris submarines and improvements to the FBM Control System Communications.

Senator YOUNG. Let me be sure I understand this matter of the overhaul of the Polaris submarines. These are some of the 10 first Polaris submarines that will not be converted to the Poseidon configuration, so they are included in the overhaul program funded from O. & M., rather than the conversion program funded from the "Shipbuilding and Conversion" appropriation.

Admiral MINTER. That is correct, Senator Young. Thirty-one of the 41 Polaris submarines will be converted to Poseidon. Here I am talking about the overhaul of three of the 10 Polaris submarines that cannot be converted to Poseidon.

STRATEGIC FORCES

FLUCTUATION IN FUNDING

Chairman ELLENDER. In the Strategic Forces budget activity you are requesting an increase of $27.4 million over the revised 1972 estimate, the bulk of which, as shown on page 1–1–1, is due to increases in the Fleet Ballistic Missile System program. On pages 1–1–2 and 1–1–3 you indicate that almost $30 of the $32 million increase in the FBM program is due to the increase in the number of regular ship overhauls. What I would like you to explain is, why can't you schedule these overhauls so that they do not cause such fluctuations in your budget requests? After all, they are regular ship overhauls. Is there any thing that can be done to avoid this sort of thing in the future? This sort of fluctuation ought to be avoided if we can do so.

Captain TISDALE. In the 3 year period of this budget sir, only 10 ships of the SSBN 598 and 608 class would be eligible for overhaul. The remaining 31 submarines are being converted to Poseidon capability over an approximate 7-year period under the SCN appropriation. While it would be desirable to space these overhauls more evenly over the fiscal years, the actual scheduling must consider repair requirements, nuclear core replacement dates, and operational commitments. For example, because of core replacement dates, no overhauls were scheduled in fiscal year 1970 whereas three were overhauled in fiscal year 1971. To have scheduled one or two of these overhauls in fiscal year 1970 would not have been cost effective since too much core

life would have remained in the replaced cores. The same general situation pertains in fiscal year 1973. In future years the overhauls will be spaced as evenly as possible considering these same factors.

1972 Funding Changes

Chairman Ellender. Before we conclude the first budget activity, Strategic Forces, would you please explain in detail the increases and decreases to the fiscal year 1972 costs that cause the fiscal year 1972 estimate of $277.8 million, as given in the 1973 budget justification, to differ from the estimate of $264.8 million for fiscal year 1972 provided in last year's budget justification?

Captain Boykin. An increase of $13 million consists of increases for repair of components, $6.1 million; operational support related to contractor technical support, $12.2 million; charter and hire costs of one additional ship, $1.5 million; and a decrease of $10 million due to revision of overhaul requirements. Other changes include increases of $2.9 million for wage board and classified pay raises and health benefits, and an increase of $0.3 million for miscellaneous other items.

Senator Young. Minor increases include one of $300,000 in ship operations that results from "additional ship-years in overhaul and related support and repair parts requirements." Would you be more specific about this increase, please?

Captain Boykin. During the overhaul period and in addition to the industrially accomplished repairs, a significant amount of repairs within the capability of the ship's crew are also accomplished. This increase of $300,000 relates to the repair parts and supplies utilized by the ship's crew in accomplishing these ship's force repairs.

Strategic Systems Technical Support

Chairman Ellender. Inasmuch as your request in this area does not vary that much from last year, I do not have a lot of questions but, for the record, would you please provide a table showing the funding for all the element groupings under "Strategic Systems Technical Support" for fiscal years 1972 and 1973 so that we may be able to compare the two? If the comparative figures show a great increase or decrease in any of the component elements, please explain the changes.

Mr. Kahn. I will provide that information for the record, Mr. Chairman.

(The information follows:)

[In thousands of dollars]

	Fiscal year—	
	1972	1973
Performance evaluation	$21,450	$21,209
Surveillance	3,157	3,135
Overhaul	12,484	13,914
Logistics	15,902	14,755
Reliability maintenance	44,702	43,304
Repair	27,037	26,688
Missile processing	9,848	9,921
Fleet personnel support	10,771	10,660
Transportation	3,254	2,689
Maintenance and repair of real property	162	162
Administration	21,688	22,091
Undersea long range missile system	0	3,000
Total	170,455	171,528

The new item for ULMS provides for operational system planning required for advance facility design and the study and design of an integrated supply system capable of providing total support to Undersea Long Range Missile System refits, including the weapon system. Initial efforts will focus on developing functional and organizational plans. Computer system concepts, maintenance and supply doctrines and procedural and policy documents necessary to achieving integrated material support objectives.

PROTEUS OVERHAUL

Chairman ELLENDER. I see on page 1–1–9 of the justification, that the *Proteus* will be finishing the overhaul cycle and will be returning to the fleet. The justification, however, indicates that $300,000 will be needed for the initial load of fuel and for outfitting subsequent to its overhaul. I thought the subsequent oufitting costs were normally included in the cost of the overhaul itself. Is that correct? How much of this $300,000 request is for outfitting cost and how much is for the initial load of fuel? Would you please explain why this load of fuel is as much as it is and why it is accounted for in this section of the justification?

Captain BOYKIN. During each industrial overhaul a supply overhaul is conducted concurrently. All supplies are offloaded and compared with a new allowance list for the ship. New supplies are ordered as required and any material in excess of the new allowance list is returned to the supply system. The ordering of these new supplies, defined as outfitting in this context, is from a special fund in the ship operations category. Of the $300,000, $100,000 is required for outfitting and $200,000 for the initial load of fuel following overhaul and for refresher training operations for its departure to station at Guam.

Chairman ELLENDER. With regard to the $700,000 that you are requesting for change orders for the *Proteus*, would you please explain to the committee exactly what these funds are requested for? What specific change orders will this amount fund and why are the changes necessary?

Captain TISDALE. The *Proteus* inducted into overhaul in January 1972 and will complete overhaul in November 1972—5 months into fiscal year 1973. The change order estimate provides for certain work not fully considered in the original work package and for correction of sea trial discrepancies. Examples of the kind of work considered in the estimate is as follows: Miscellaneous lagging and insulation, complete paint out, and selected boat repairs.

NONSCHEDULED SHIP REPAIRS

Senator YOUNG. With regard to nonscheduled ship repairs, I would like you to explain what you mean when you say on page 1–1–10 that "Repairs are either of an emergent or a planned nature. In fiscal year 1973 the decrease of $0.8 million reflects a less expensive YTB service craft overhaul as compared to the overhaul of the ARDM–1 in fiscal year 1972." It seems to me that the overhaul of the YTB is of a planned nature inasmuch as it is forecast more than 6 to 9 months in advance to get it into this budget. How, then, can you say that it is a nonscheduled repair? I wish you would explain this to the committee.

Captain TISDALE. The area of fleet maintenance is composed of two distinctions: regular ship overhauls which are scheduled by the Chief of Naval Operations and nonscheduled ship repairs which consist of emergent repairs and repairs of a planned nature scheduled by the

fleet commander. The distinction, then, is that in the one instance overhauls are scheduled by the Chief of Naval Operations whereas in nonscheduled ship repairs they are not scheduled by the Chief of Naval Operations, but by the fleet commander.

Senator YOUNG. If only $9.6 million was provided for in the fiscal year 1972 appropriation for supporting programs, in what activities did you reduce funding in order to raise the $7.3 million? How much was the funding reduced in each affected activity?

Captain BOYKIN. The $7.3 million for this requirement was reprogramed from budget activity 7, Central Supply and Maintenance.

SUPPORT PROGRAMS FOR FBM CONTROL SYSTEM COMMUNICATIONS

Chairman ELLENDER. I would like to refer to the FBM control system communications area for a minute and address the supporting programs. The justification indicates that the funding for these programs is to be increased by $2.7 million in fiscal year 1973. The justification doesn't say much more than that however. Would you please provide for the committee a breakdown of the essential elements in the supporting programs area, showing the growth in these elements over the fiscal year 1971–73 time frame? Would you also please explain specifically what the additional $2.7 million is requested for this year and why they are essential at this time?

Captain BOYKIN. I will provide that information for the record, Mr. Chairman.

(The information follows:)

A breakdown by project for the 3 fiscal years is as follows:

[Dollars in thousands]

Project	Fiscal year—		
	1971	1972	1973
Speccom	363	403	401
Project Management	888	1,012	1,102
Pilgrim	319	518	640
Brer Rabbitt	162	100	120
SECT	118	232	650
Verdim	300	507	1,439
CEP	413	576	1,696
Total	2,563	3,348	6,048

The $2.7 million increase is related to four specific programs of which the largest increase is related to the CEP (Continuing Evaluation Program). Distribution follows:

$+1.2 million CEP provides for increased contract engineering technical services to measure the effectiveness of existing and new communication systems essential to fleet operations with Johns Hopkins APL for all FBM Command and Control Systems.

$+.9 million VERDIN program [deleted]. Additional resources provide for engineering services by Collins (prime contractor) and NELC.

$+.4 million SECT, Submarine Emergency Communication Transmitter, Bouy signal device for SSN/SSBN provides for additional costs for replenishment repair parts, maintenance refurbishment and test evaluation due to the planned installation of [deleted] additional systems and support for installed systems. There were 33 systems in FY 1971, 50 in FY 1972 and [deleted] planned for FY 1973.

$+.1 million Project Pilgrim increase primarily provides for increased support to the Coast Guard relative to additional workload generated by Navy by use of coastal communication systems.

$+.1 million increase is for administrative costs for the special Communications Project Office.

NAVAL SPACE SURVEILLANCE SYSTEM

Chairman ELLENDER. I see on page 1–1–11 that the Missile and Space Defense budget supports the U.S. Naval Space Surveillance System and that the system headquarters and field station operation and maintenance costs are provided for out of this request. Would you please indicate for the committee where the headquarters and field stations are located, how much of the requested funding is for each, and how many personnel, civilian and military, are stationed at each?

Capt. D. W. ABERCROMBIE. The headquarters is located at Dahlgren, Va. There are three transmitter sites, at Jordan Lake, Ala.; Kickapo Lake, Tex.; Gila River, Ariz. and six receiver sites located at Fort Stewart, Ga.; Hawkinsville, Ga.; Silverlake, Miss.; Red River, Ark.; Elephant Butte, N. Mex.; San Diego, Calif.

The nine field stations are operated by contractor personnel under a contract with Halifax Engineering Corp. at a cost of $896,000. All of the military and civilian personnel included in the budget are located at the headquarters.

Chairman ELLENDER. Would you also, again regarding the Naval Space Surveillance System, explain how you were able to effect the $48,000 savings that the justification indicates?

Capt. D. W. ABERCROMBIE. The savings of $48,000 consists of a reduction of $26,000 for 2 less man-years, $10,000 for 2 less work days in fiscal year 1973, $23,000 for average grade reduction and $127,000 for the nonrecurrence in fiscal year 1973 of high value vacuum tubes for the transmitters and receivers and repair parts for the antenna array at the Kickapo Lake transmitter site. This reduction of $186,000 is partially offset by an increase of $38,000 for pay raise and health benefits requirements and an expected contract price increase for the operation of the Field Stations of $100,000.

FBM SYSTEMS COMMAND

Senator YOUNG. With regard to the command request for the Fleet Ballistic Missile Systems, can you tell us how many flotillas and squadrons you are speaking of?

Capt. BOYKIN. There are a total of seven Submarine Flotillas Nos. 2, 6, and 8 and Submarine Squadrons Nos. 14, 15, 16, and 18.

Senator YOUNG. With regard to the command request for the Fleet Ballistic Missile Systems, would you please give the committee an idea of how many personnel you are speaking of in regard to command and how many personnel are stationed at each flotilla or squadron headquarters.

Capt. BOYKIN. There are no civilian personnel supported in this budget program and the command for Submarine Forces is financed in budget activity 2. Military personnel assigned to the flotillas and squadron staffs in the program total 348. Flotilla No. 2 has 66; No. 6, 71; No. 8, 82; Squadron No. 14, 35; No. 15, 32; No. 16, 31; and No. 18, 31.

Senator YOUNG. With regard to the command request for the Fleet Ballistic Missile Systems, are the command elements normally seaborn or land based? What I am getting at is that, in the "Justification of

Funds" portion on page 1–1–12, you indicate that operation and repair of service craft and the cost of port services are costs budgeted for in the command area. Would you please explain what these costs are and how they happen to be included in the operating costs of the commanders?

Captain BOYKIN. Normally the flotilla staffs are land based and the squadrons are afloat. The reason costs of operation and repair of service craft are included in this program is because certain craft, such as floating drydocks, storage barges, floating cranes, and harbor tugs are assigned to the flotillas as services provided by these service craft are not available in port. Therefore the costs to operate and maintain them are the responsibility of the flotilla staff. The port service costs are for such items as pilotage and garbage removal at Holyloch as there is no naval facility there to provide these services to the squadrons.

BUDGET ACTIVITY 2—GENERAL PURPOSE FORCES

Admiral MINTER. The fiscal year 1973 Operation and Maintenance, Navy request for Budget Activity 2 is $1,611,700,000, a net decrease of $45 million from fiscal year 1972. This budget activity finances the support of forces and shore activities under the operating force commanders, and support of the unified commands. This activity is divided into eight major budget programs.

The aircraft forces program provides for operating costs—fuel, oil, consumable supplies, and other direct support—for Navy and Marine aircraft assigned to the active fleet. The resources requested reflect in dollar terms Navy and Marine Corps requirements to provide for combat readiness of attack and antisubmarine warfare carrier squadrons, shorebased, antisubmarine and early warning squadrons, Marine Corps air wings, and supporting aviation units—$225.1 million is requested in fiscal year 1973, a net decrease of $2.5 million from fiscal year 1972. Within this total, the amount for aircraft operations in fiscal year 1973 is $204.7 million in support of 1,241,000 flying hours, a decrease of $2.6 million and 43,000 flying hours from fiscal year 1972. This decrease is primarily attributable to reduced SEASIA activity.

FLEET MAINTENANCE 1972 AND 1973

Chairman ELLENDER. Admiral, in view of the contemplated fleet reduction would you put in the record the difference in cost to the Government to maintain the fleet in fiscal year 1973 compared to what the cost was last year?

Admiral MINTER. We can put that in the record.

Chairman ELLENDER. All right.

(The information follows:)

The savings in fiscal year 1973 related to ship inactivations are in two areas:

Ship operations. —$18,830

This represents ships fuel, utility charges, general supplies and repair parts were required to support these ships in fiscal year 1972 and will not be required in fiscal year 1973.

Nonscheduled ship repairs.—$7,583

This reflects non-scheduled repairs that are accomplished between overhauls that will not be required due to ships leaving the forces in fiscal year 1973.

Chairman ELLENDER. Proceed.

Admiral MINTER. The funding we have requested for flying hours is intended to provide for safe operations at a level of individual pilot readiness approximately equal to that of fiscal year 1972.

$20.4 million is included to support aviation personnel travel, force commands, and resources for the provisioning of aircraft repair parts for fleet marine air wings.

The ship forces program provides for the operating and maintenance expenses of Active fleet ships. An amount of $830 million is requested, a decrease of $36.3 million from fiscal year 1972.

Sum of $280.6 million is requested for ship operating expenses, an increase of $11.2 million over fiscal year 1972. These resources provide fuel, utility services, and supplies and equipage for active fleet ships. The increase is chiefly the result of fuel price increases, partially offset by reduced operating costs associated with a fewer number of ships.

Sum of $530.0 million is requested for fiscal year 1973 ship repair costs, a decrease of $52.1 million from fiscal year 1972.

In fiscal year 1973, 92 overhauls are scheduled at an estimated cost of $358.3 million, as compared to 98 overhauls at an estimated $416.4 million in fiscal year 1972.

This decrease reflects primarily one less nuclear submarine and two less carriers in the overhaul schedule. Funds requested for nonscheduled repairs total $171.7 million, an increase of $6 million over fiscal year 1972.

This increase is requested for selected restricted availabilities for our aircraft carriers, interim drydockings and service craft overhauls partially offset by reductions in the number of ships we are supporting.

In addition, funding is included for the initial provisioning of repair parts for carrier-assigned aircraft and to support fleet personnel travel.

1972 APPROPRIATION AND 1973 BUDGET REQUEST

The fiscal year 1973 request for these programs is $19.4 million. An increase of $4.6 million from fiscal year 1972 provides for the operation and evaluation of a civilian manned oiler for underway replenishment.

NUCLEAR CORES

Chairman ELLENDER. With respect to the overhaul of a nuclear submarine, just what is involved in addition to the new core for the nuclear propulsion system?

Admiral MINTER. There is quite a bit, sir. They try to tie the overhaul cycle to the recoring of the submarine when they can. The recoring is normally done at overhaul time, but the overhaul consists of repairs to the major components of the entire ship. All of our ships are done the same general way. Major machinery and electrical equipment is all overhauled and repaired as necessary at this overhaul time.

Chairman ELLENDER. That is usually done when you change the core.

Admiral MINTER. In the case of the nuclear submarines, that is correct.

Chairman ELLENDER. And the older cores last from 7 to 10 years?

Admiral MINTER. Yes, sir. I will ask Admiral Sonenshein to expand on this, but the developments in this area have given us increased core life. We are now looking at hopefully a longer period of time between overhauls.

Admiral SONENSHEIN. On the new core lives we plan to have about a 10-year average lifetime. We expect a 10-year average life for the new cores in our submarines and surface ships as well.

You had another point, Senator, that you were asking.

Admiral MINTER. He asked what was involved in the overhaul other than recoring.

OVERHAUL CYCLES

Chairman ELLENDER. What work is done between overhauls? Ten years is a mighty long time.

Admiral SONENSHEIN. You are talking about the overhaul cycles. For nuclear ballistic missile submarines we are now approaching a 5-year interval for regular overhauls in the naval or private shipyard. In between, at the deployed sites, these submarines are given tender repairs, refits, when they return from patrol.

At the end of each patrol they have a refit before they go out for another patrol. These refits are for essential repairs and some urgent alterations are also accomplished at this time.

With regard to the nuclear power attack submarines, the SSN's, the overhaul interval is less because we do not have this extensive worldwide support system for them, and the interval for those ships is approximately 4 years.

They return to the shipyard for overhaul. They do not get overhauled at deployed sites. But for both the SSBN's and SSN's we have underway now combined surveillance inspection and maintenance programs to determine if these intervals can be extended, to take full advantage, or as much advantage as possible, of the increased lifetime of new cores. So we hope to develop a program that will permit operating cycles equal to core lifetimes so that overhauls and recoring will coincide. We are not there yet.

MISSILES

Chairman ELLENDER. Going back to the Polaris and Poseidon submarines for a moment, just how long can the missiles be left in the submarine without maintenance?

Mr. KAHN. The tender alongside which the submarine comes does have a supply of missiles. Periodically, after the submarine returns for refit, if there are any defective missiles, they are replaced alongside the tender and then shipped back for repair. In addition, a small sample of the remaining missiles is returned for evaluation as a part of surveillance program. So there is a constant return evaluation and repair cycle of missiles as well as equipment.

Chairman ELLENDER. That can be done alongside of your tenders?

Mr. KAHN. Yes, sir; it is done after each patrol, when the submarine comes alongside the tender.

Chairman ELLENDER. Proceed.

OPERATION AND MAINTENANCE, FLEET SUPPORT ACTIVITIES

Admiral MINTER. The base operations program provides resources for the operation and maintenance costs of fleet support activities. The fiscal year 1973 request is $387 million, a decrease of $0.2 million from fiscal year 1972.

The fiscal year 1973 request indicates level funding, however, large program reductions have taken place; namely a decrease of $6.1 million in civilian personnel man year costs.

Material, services and contract requirements reflect a decrease of $4 million. These decreases are offset by an increase of $4 million for the classified civilian pay raise and increased costs to the Government related to rising health benefits costs, and an increase of $5.9 million due to the transfer of NATO financial support responsibility from budget activity 9.

The Special Combat Support Forces program provides for the operating costs of forces consisting of construction battalions, special warfare groups, and Sea-Air-Land (SEAL) teams.

It also provides support funds for landing craft associated with amphibious commands. An amount of $24 million is requested, a decrease of $3.6 million from fiscal year 1972. This decrease is primarily related to construction battalions.

TRANSFER OF NATO FINANCIAL SUPPORT

Chairman ELLENDER. I notice on the fifth line that you have an increase of $5.9 million due to transfer of NATO financial support responsibility from budget activity 9.

Admiral MOORE. Yes, sir. That was a functional transfer from budget activity 9 to budget activity 2 and does not involve a change in the amount of dollars associated with the program. It was simply a change in program identity.

Chairman ELLENDER. It did not affect the amount. It is just a bookkeeping transaction?

Admiral MOORE. It is a bookkeeping transaction to aline the purpose of the funds with the budget activity.

SUPPORT FOR FOREIGN NATIONS

Chairman ELLENDER. In going over your statement last night I noted a request for some $58 or $59 million for the support of other nations. Is that total included in budget program No. 10 that you cover later in your statement?

Admiral MINTER. Yes, sir. That is all included in program 10.

GENERAL PURPOSE FORCES

Admiral MINTER. The training program provides support for fleet air, surface and subsurface training activities in order to maintain fleet readiness. The fiscal year 1973 request is $56 million, an increase of $0.2 million from fiscal year 1972.

The Unified and Operational Commands Program provides resources in support of Service and Force Commands, Unified Commands, and Fleet Air Wings and assigned aircraft.

The fiscal year 1973 request is $78.5 million, a net decrease of $2.1 million from fiscal year 1972 primarily in general operating expenses.

The Undersea Surveillance System program provides for the operating and maintenance costs of 21 naval facilities involved in the collection and processing of data associated with underwater surveillance.

The fiscal year 1973 request is $10.4 million, a decrease of $0.1 million from fiscal year 1972 chiefly related to support costs.

Our fiscal year 1973 request for Joint Chiefs of Staff directed and coordinated exercises is $539,000, a decrease of $100,000 from fiscal year 1972.

These resources provide for expenses of the effort involved in obtaining right-of-way clearances for the conduct of joint services operational exercises, associated travel costs, and other associated costs.

Aircraft Forces

Chairman Ellender. I notice on page 1–2–1 that your request represents reductions in 7 of the 8 major program elements in this budget activity. We will try to touch base on all of the changes. To begin with, you indicate a reduction of $2.5 million in aircraft forces, the bulk of which is associated with aircraft operating costs. On page 1–2–3, you show that the net decrease is the result of an increase of $3.6 million associated with aviation fuel price increases, offset by decreases in Southeast Asia activities and miscellaneous programs. Would you please be more specific about the $5.1 million decrease due to reduction in Southeast Asia activities? How did you arrive at the figure $5.1 million?

Colonel Bjorklund. In fiscal year 1972 we are supporting an average of [deleted] attack sorties per month in Southeast Asia at an annual incremental flight operations cost of $9.6 million compared to an average of [deleted] attack sorties per month in fiscal year 1973 at an incremental cost of $4.5 million for a reduction of $5.1 million.

Miscellaneous Program

Chairman Ellender. Would you also please explain in more detail what the miscellaneous programs that are to be reduced are?

Colonel Bjorklund. This miscellaneous program reductions referred to on page 1–2–3 are a result of constrained funding and have been distributed throughout the program with particular consideration to effecting minimum impact on readiness. We did not intend to imply specific program reductions in terms of deletion of mission or commitment.

Aviation Fuel Increase

Chairman Ellender. I think too that we need a full explanation regarding the aviation fuel increases. If you would supply the gross figures on total flying-hours supported and the cost of fuel in 1972 compared to 1973 in your explanation, I think we could get a better picture.

Colonel BJORKLUND. The aviation fuel cost increase for jet fuel is from 12.3 cents per gallon in fiscal year 1972 to 12.8 cents per gallon in fiscal year 1973, and for aviation gas from 17 cents per gallon in 1972 to 17.4 cents in 1973. In fiscal year 1972 in budget activity 2 we are supporting 1,705,100 flying-hours at a cost of $265 million of which $120.1 million is for fuel, oil, and lubricant (POL), compared to 1,646,581 flying hours in fiscal year 1973 at a cost of $262 million including $120.7 million for POL. The $3.6 million increase for aviation fuel shown on page 1–2–3 is associated only with the Aircraft forces budget program. There is an increase of $4.5 million in all of budget activity 2. With regard to our total flying-hour program in all budget activities there is an aviation fuel cost increase amounting to $5.9 million. Our total flying-hour program is 2,752,506 hours at $329.3 million in fiscal year 1972, including $158.8 million for POL compared to our fiscal year 1973 program of 2,705,524 hours at $329.9 million including $161.1 million for POL.

SHIP FORCES

Chairman ELLENDER. Turning now to ship forces, you indicate that the reduction in this program will be $36.4 million in fiscal year 1973. The major breakdown that you provide on page 1–2–4 will be inserted into the record at this time and we will work from it.

(The information follows:)

[In thousands of dollars]

	Fiscal year—	
	1972 estimate	1973 estimate
Aircraft operations	1,103	1,110
Flight operations support	8,034	8,287
Ship operations	269,499	280,608
Regular ship overhauls	416,438	358,275
Nonscheduled ship repairs	165,687	171,728
Supporting programs	5,615	9,993
Total	866,376	830,001

GENERAL PURPOSE FORCES: 1972 FUNDING REVISION

Chairman ELLENDER. Turning now to the general purpose forces request, I noticed on page 1–2–1 that the revised estimate for fiscal year 1972 is $1,656,608,000, whereas the original estimate as it appeared in the fiscal year 1972 justification was for only $1,611,393,000, which is $45,215,000 less than the revised estimate. Would you please explain in a general way just how these differences came about?

Captain BOYKIN. Yes, sir; the $45.2 million increase is comprised of a $27.4 million increase for supplemental wage board and the January 1972 classified civilian pay raise, $4.7 million increase related to the dollar revaluation and health benefits, $20.1 million increase in base operations costs and costs associated with the increased utilization of Navy distillate fuel offset by reductions of $5.2 million due to congressional action, and $1.8 million related to functional transfers between budget activities.

AIRCRAFT DECKLOAD CHANGES

Senator YOUNG. In regard to Flight Operations Support I notice increases of almost $300,000. Your explanation of this increase, as pro-

vided in the justification, is that it is due to "aircraft deckload changes." What do you mean by "aircraft deckload changes" and what is the reason for the increase at this time?

Captain BOYKIN. The phrase "aircraft deckload changes" refers to changes made in the composition of the aircraft assigned to a carrier either between deployments or upon completion of a scheduled overhaul. This could be either a result of the influx of new production aircraft and model or series changes; for example changing from A–4's to A–7's or A–7A to A–7E. A review and comparison of on-board aviation material is made against the aviation material requirements list for those aircraft assigned and new obligation authority is requested for that material which is not available within on-board inventories and which will have to be purchased from the Navy stock fund.

SHIP OPERATIONS INCREASES

Chairman ELLENDER. Despite the overall reduction in this ship forces program, I notice a substantial increase in ship operations. The increase is a little over $11 million. The justification on page 1–2–4 indicates that the increase is due to deliveries of new and converted ships and a fuel price increase, which offset the reduced number of ships to be supported. Let's start with the reduction in ships to be supported first. You indicate the support in fiscal year 1973 is for 550.4 ship-years and 1,363,758 steaming hours. How does that compare with 1972 and what is the reason for the reduction?

Captain BOYKIN. Sir, a comparison of ship-years and steaming hours for fiscal year 1972 and 1973 is as follows: fiscal year 1972, 603.7 ship-years and 1,414,469 steaming hours; and fiscal year 1973, 550.4 ship-years and 1,363,758 steaming hours.

In terms of end year strengths, there are 21 ships being added to the program from new construction and conversion and 81 being inactivated, transferred to Naval Reserve Forces, loaned, or stricken from the Navy Register. The ship types being retired from the Active Fleet are as follows: ASW carrier, 1; diesel submarines, 11; destroyers, 9; destroyers (to Naval Reserve), 12; destroyer escorts, 6; auxiliaries, 8; amphibious, 12; minesweepers (to Naval Reserve), 9; and minesweepers, 13.

FLIGHT OPERATIONS SUPPORT

Senator YOUNG. Please explain the increases and decreases in the fiscal year 1972 costs for Flight Operations Support that cause the fiscal year 1972 estimate of $8 million, as given in the 1973 budget justification, to differ from the estimate of $13.4 million for fiscal year 1972 provided in last year's budget justification.

Captain BOYKIN. The $5.4 million reduction is primarily attributed to a Navy applied adjustment to resources which provide for aviation repair parts aboard attack carriers. This reduction was made possible by a change in the composition of the aircraft assigned to the carriers and management improvements by which the fleet is making better use of its assets in support of the aircraft assigned.

1972 SHIP OPERATIONS COST

Chairman ELLENDER. Please explain the increases and decreases to the fiscal year 1972 costs for Ship Operations that cause the fiscal year

1972 estimate of $269.5 million, as given in the 1973 budget justification, to differ from the estimate of $260.3 million for fiscal year 1972 provided in last year's budget justification.

Captain BOYKIN. Yes, sir. The net increase of $9.2 million is composed of two principal reasons: a decision to retain USS *Hancock* (CVA–19) in the force levels and increased consumption of Navy distillate fuel.

NEW SHIP OPERATION COSTS

Senator YOUNG. Would you please explain to the committee what sort of costs make up the $6 million increase associated with the delivery of ships. It would seem that any outfitting would be part of the construction or overhauling costs, but apparently that is the sort of cost included here. Please clarify this matter for us.

Captain TISDALE. Sir, you are correct that outfitting is part of the new construction cost. What is included here is funding for the day-to-day operating cost of these ships after construction is completed and they enter the fleet. Examples of the items would be general supplies, repair parts to replace these consumed, ships fuel and utility charges when ships are in port. This is considered to be an increase because the same type expenses for ships leaving the fleet is considered as a decrease.

FUEL COSTS

Chairman ELLENDER. Again we come to the increased fuel costs. I think that it would be a good idea at this point in the record to pinpoint where other increases in fuel costs are located in the request. Would you please break this out for us by budget activity, budget program, and functional breakdown within the budget program? A simple listing with the amount of increase associated with each will do.

Captain BOYKIN. I will supply it for the record.

(The information follows:)

Functional program	Budget program	Dollars (thousands)
Budget activity 1:		
Aircraft operations	FBM control system communications	64
Ship operations	Support ships	102
Total, budget activity 1		166
Budget activity 2:		
Aircraft operations	Aircraft forces	3,592
	Ship forces	7
	Base operations	50
	Training	859
	Unified and operational command	8
Ship operations	Ship forces	9,277
Total, budget activity 2		13,793
Budget activity 5:		
Aircraft operations	Naval Air Reserve forces	511
Ship operations	Naval Ship Reserve forces	192
Total, budget activity 5		703
Budget activity 8:		
Aircraft operations	Training	756
Ship operations	do	182
Total, budget activity 8		938

Chairman ELLENDER. In addition, it would be appropriate to follow this listing with a full explanation of the whys and wherefores of the increases. That way when we come to the increases later in the justification, we won't have to ask the same question each time.

Captain BOYKIN. The increased funds requested for fuel reflects the application of consumption rates for both ships and aircraft to programed steaming and flying hours reflecting fuel price increases based on forecasts of major fuel suppliers. I will provide for the record a tabulation setting-out the per barrel fuel cost for each type for fiscal years 1971, 1972, and 1973.

(The information follows:)

	Fiscal year—		
	1971	1972	1973
Navy special fuel oil	$2.75	$3.73	$4.00
Distillate	3.50	4.35	4.75
Diesel	4.59	4.91	5.00
Jet fuel	5.05	5.17	5.37
Prop fuel	6.85	7.14	7.31

1972 REGULAR SHIP OVERHAULS

Chairman ELLENDER. Please explain the increases and decreases to the fiscal year 1972 costs for regular ship overloads that cause the fiscal year 1972 estimate of $416.4 million, as given in the 1973 budget justification, to differ from the estimate of $443 million for fiscal year 1972 provided in last years budget justification.

Captain TISDALE. The change is primarily related to additions and deletions of ships to and from the overhaul schedule. I would like to provide a tabular statement for the record showing the details.

(The information follows:)

	Number of O/H	Amount (thousands)
Fiscal year 1972 congressional submission	136	$443,024
Reductions:		
Force level reductions (5 overhauls)	−5	−16,277
Reduction in shipyard employment to viable level—end strength 65,700	−10	−30,000
Transfer 4 ships to NRF, fiscal year 1972	−4	−1,200
Overhaul reduction to fund U.S.S. Ranger (CVA 61) increased cost	−2	−6,275
Other overhaul deletions to fund increased unit cost, increasing advance planning requirements, additional overhauls, and transfer to RA/TA	−28	−68,984
Increases:		
U.S.S. Ranger (CVA 61) increase cost		+6,275
Additional overhauls	+11	+34,623
Unit cost increases		+29,784
Increase in advance planning		+6,837
Increase in change orders		+4,618
Pay raise (classified and wage board)		+14,013
Fiscal year 1972 column of fiscal year 1973 congressional	98	416,438

1973 OVERHAUL SCHEDULE

Chairman ELLENDER. I would like you to add to the information provided by the justification, a list of the types of craft in the overhaul schedule for 1973 and the number of each. If you can break out the costs by type, that would be helpful too.

Captain TISDALE. I would be glad to provide that information for the record.

(The information follows:)

FISCAL YEAR 1973 SHIP OVERHAUL SCHEDULE

[Dollars in thousands]

Ship type and hull No.	Name	Fiscal year 1973 Congressional budget
SSBN:		
602	Abraham Lincoln	[Deleted.]
608	Ethan Allen	
609	Sam Houston	
CV: 60	Saratoga	
SS:		
351	Greenfish	
478	Cutlass	
483	Sea Leopard	
566	Trout	
567	Gudgeon	
576	Darter	
SSN:		
571	Nautilus	
597	Tullibee	
607	Dace	
638	Whale	
639	Tautog	
649	Sunfish	
662	Gurnard	
AS: 18	Orion	
ASR:		
8	Coucal	
9	Florikan	
14	Petrel	
ATF: 67	Apache	
CG:		
10	Albany	
11	Chicago	
DLG:		
16	Leahy	
21	Gridley	
28	Wainwright	
32	Standley	
DD:		
743	Southerland	
763	Wm. C. Lawe	
782	Rowan	
783	Gurke	
786	Richard B. Anderson	
826	Agerholm	
841	Noa	
845	Bausell	
850	Joseph P. Kennedy	
865	Charles R. Ware	
871	Damato	
878	Versole	
883	Newman K. Perry	
842	Bigelow	
944	Mullinnix	
946	Edson	
DDG:		
8	Lynde McCormick	
9	Towers	
12	Robison	
15	Berkeley	
20	Goldsborough	
36	John S. McCain	
DE:		
1043	Edward McDonald	
1045	Davidson	
1055	Hepburn	
DEG: 4	Talbot	[Deleted.]
AD:		
15	Prairie	
27	Yellowstone	
38	Puget Sound	
LKA:		
115	Mobile	
116	St. Louis	
LPD:		
1	Raleigh	
2	Vancouver	
4	Austin	
6	Duluth	
9	Denver	
LPH: 3	Okinawa	
LPSS: 574	Grayback	
LSD:		
32	Spiegel Grove	
34	Hermitage	
36	Anchorage	
PG:		
85	Gallup	
89	Marathon	
90	Canon	
92	Tacoma	
93	Welch	
94	Chehalis	
99	Beacon	
101	Green Bay	
MSO:		
433	Engage	
442	Fearless	
443	Fidelity	
445	Force	
446	Fortify	
449	Impervious	
456	Inflict	
AE: 25	Haleakala	
AF: 59	Vega	
AO:		
109	Waccamaw	
146	Kawishiwi	
AR: 28	Grand Canyon	
ARC: 2	Neptune	
ARS:		
25	Safeguard	
43	Recovery	
AFT:		
103	Hitchiti	
110	Quapaw	
113	Takelma	
Subtotal		$383,932
Advanced funding		33,927
Change orders		15,999
Total		443,858

1972 Decrease on Overhauls

Senator Young. In last year's justification, you indicated that 136 ships were scheduled to be overhauled in 1972 but on page 1–2–5 of this year's justification, you indicate that only 98 are to be overhauled

in 1972. If this is so, how do you justify even the revised 1972 estimate of $416 million?

Captain TISDALE. The change is based on deletion of 49 ships from the overhaul schedule and addition of 11 other ships to the schedule. The tabular statement to be provided in response to your previous question on the fiscal year 1972 overhaul budget will provide details on the changes in the fiscal 1972 program.

STATUS OF FUTURE SHIP OVERHAULS

Chairman ELLENDER. With the reduction in ship-years and steaming hours mentioned in regard to ship operations, do you anticipate that the number and scope of overhauls in future years will be reduced also?

Captain TISDALE. Although the total number of ships is being reduced the ships that remain are more sophisticated and complex than before. An example is a diesel submarine and World War II tank landing ship being replaced by a nuclear attack submarine and an 1179 class tank landing ship, respectively. Even though these ships are newer, repairs to the various complex systems are generally more expensive. Another factor is that there are 39 ships that should, by Navy maintenance policy, have overhauled in fiscal year 1973 which are being overhauled in fiscal year 1974 due to lack of funding. Present planning indicates that we must overhaul approximately 120 ships to keep these deferrals at a manageable level in fiscal year 1974.

SELECTED RESTRICTED AVAILABILITIES

Chairman ELLENDER. Will you please explain how the increase of $5.5 million in selected restricted availabilities was determined? Please be specific.

Captain TISDALE. Selected restricted availabilities are either a predeployment or postdeployment industrial availability; the deployment being either to the Mediterranean or to the Western Pacific. Based upon their deployment phasing as well as cyclical scheduled overhaul dates, three additional selected restricted availabilities are required in fiscal year 1973. A selected restricted availability is of 2 months duration during which a specific and intense work package is accomplished.

INTERIM DRYDOCKING

Senator YOUNG. With regard to "interim drydockings," I wish you would tell the committee specifically what you mean by this and why $4 million additional is required for this purpose in fiscal year 1973? How much was provided in fiscal year 1972 for "interim drydocking?"

Captain TISDALE. An interim drydocking is that drydocking which is scheduled approximately every 18 months or at the midpoint between regularly scheduled overhauls. This interim drydocking is required to assure water tight integrity. Based upon the increasing nuclear submarine population, two additional drydockings are scheduled in fiscal year 1973. For fiscal year 1972, $9,461,000 was required for this purpose, and the request for fiscal year 1973 is $13,416,000, which is the increase of $4 million to which you referred.

Service Craft Overhauls

Chairman Ellender. Finally, with regard to service craft overhauls, I presume that this involves the overhaul of drydocks, et cetera, that are used in the overhaul of other ships. Would you please explain what is involved and how you schedule work on this equipment? How much was provided for this purpose in fiscal year 1972, and how many facilities or pieces of equipment were overhauled with those funds?

Captain Tisdale. These funds provide for overhaul of drydocks used in the overhaul of other ships, submersible vehicles, and landing craft. The repairs are strictly in the hull and machinery areas to return the service craft to an acceptable condition. The industrial work is scheduled so as not to interfere with Active Fleet overhauls, et cetera, it is scheduled around Active Fleet overhauls. A total of $2.9 million was provided in fiscal year 1972, for 12 service craft overhauls.

Oiler Operation

Senator Young. You are requesting an increase of $4.4 million for supporting programs, which is almost a 100-percent increase over the amount provided last year. You justify this increase primarily on the basis of funding "related to the oiler operation" but I do not know what oiler operation you are referring to or why the costs should rise so much. Would you please clear this up for the committee?

Captain Boykin. Yes, sir. The additional $4.4 million is required for the operation of a civilian manned Navy oiler by the Military Sealift Command (MSC) on a trial basis in fiscal year 1973. The objective of this yearlong trial is to determine the feasibility of providing fleet logistic support by civilian personnel. The results of this test could have far-reaching effects in that the possibility of utilizing merchant marine type ships manned by civilian crews in fleet logistic support needs to be examined. This trial will generate a true operational feasibility analysis in that a full-range of replenishment operations in the 1st and 7th Fleets will be conducted.

Flying Hours Compared

Chairman Ellender. With regard to aircraft operating and support costs, the material on page 1–2–7 of the justification indicates a reduction of $200,000 below fiscal year 1972. The $6.3 million provided is requested to support 103,032 flying hours in 1973. Would you tell the committee how many flying hours the $6.5 million provided in 1972, is expected to support so that we can have a basis of comparison?

Colonel Bjorklund. The $6.5 million provided 106,036 flying hours in fiscal year 1972 compared to $6.3 million and 103,032 hours in 1973.

1972 Maintenance of Real Property

Chairman Ellender. Turning now to maintenance and repair of real property, would you please explain the increases and decreases to the fiscal year 1972 costs in this area that cause the fiscal year 1972 estimate of $58.2 million, as given on page 1–2–7 of the 1973 budget justification, to differ from the estimate for fiscal year 1972 of $53.5 million provided in last year's justification book?

Captain BOYKIN. The increase of $4.7 million is due to an increase of $0.7 million for wage board pay raises, reprograming actions of $1.8 million for boiler repairs and harbor dredging in Rota, Spain, and $2.2 million to bring the maintenance of real property total more in line with anticipated costs.

PHASEDOWN OF RODMAN AND SAN JUAN NAVAL STATIONS

Chairman ELLENDER. Given the revised estimate for 1972, you are requesting a decrease of $2.8 million primarily due to the phasedown of naval stations at Rodman and San Juan. Would you please explain to the committee why these stations are being phased down and what specific activities are going to be cut back?

Captain BOYKIN. These stations are being phased down as an act of economy. The Naval Station San Juan has been phased down into a naval support activity. There are no longer port or pier services at San Juan and the large disposal activity has been closed. Fleet support previously provided by Naval Station San Juan will be provided by Naval Station Roosevelt Roads, Puerto Rico. Functions of the Naval Station Rodman affected by the cut back are accounting, supply operations, data processing, Marine Corps armory and ordnance support, tennis courts and golf course.

1972 STATION OPERATIONS

Chairman ELLENDER. Station operations is another area where the budget estimate for fiscal year 1972 provided in this year's justification book and that provided in the 1972 justification differ substantially. The original estimate was $282.4 million, whereas the revised estimate per the 1973 book is $322.2 million. Before we get into the increase based on the revised estimate, I would like you to explain to the committee what the increases and decreases are that result in this net increase.

Captain BOYKIN. The increase of $39.8 million consists of increases for January 1971 graded pay raise, $6.6 million; January 1972 graded pay raise, $3.3 million; wage board pay raise, $7.4 million; currency revaluation, $2.6 million; health benefits increase and relocation of squadron from Naha, $1.1 million; restore funds for base closures not approved, $3.5 million; increase cost of base fuel and utilities, $5.5 million; to keep base at Yokosuka open, $6.2 million; to prevent reduction in force at west coast bases, $5.7 million. These increases are offset by decreases of $2.1 million due to congressional action in the areas of service support contracts, military personnel, and miscellaneous items.

PATROL SQUADRON UNIT RELOCATION

Senator YOUNG. There is an increase related to "increased base loading" due to relocation of a patrol squadron and support units. The increase requested is $2.7 million. Could you tell us what specific units are being relocated and from where to where? Is there to be an offsetting reduction in the costs of operation of the stations from which these units are being transferred? Do these transfers have anything to do with the phase out of Rodman and San Juan Naval Stations?

Captain BOYKIN. The unit is a P–3 aircraft squadron being transferred [deleted]. There are no offsetting cost reductions and this relocation is not related to Rodman and San Juan Naval Stations.

AIRBORNE MINE COUNTER MEASURE PROGRAM

Chairman ELLENDER. There is an increase of $1.3 million for medical services, airborne mine counter measure program, base security and self-help programs. I wish you would go into the airborne mine counter measure program in a bit more detail and tell us how much is being requested for this and why it is necessary. How much is provided in the base figure for this mine counter measure program?

Captain BOYKIN. The purpose of airborne mine counter measures program is to establish a quick responsive operational capability of minesweeping via helicopters. This capability will permit a Navy minesweeper force level adjustment of 38 MSO's in fiscal year 1972 (32 in B.A. 2 and six in B.A. 5) and 23 MSO's in fiscal year 1973 (10 in B.A. 2 and 13 in B.A. 5). These decreases have been reflected in the appropriate fiscal year 1973 budget exhibits. Funds totaling $0.3 million are included in the fiscal year 1972 budget request and $1.5 million in fiscal year 1973. The funds requested are for base operations support at the Naval Station Charleston, interservice support agreement with the Air Force for helopads and hangar base at the Air Force Base Charleston, for one 90-day operational deployment to the Mediterranean and to the Pacific, procurement, maintenance, operations of minesweeping equipment and for helicopter flight operations, maintenance, and outfitting.

CIVILIAN PERSONNEL DECREASE

Chairman ELLENDER. There are three items of decrease, the first of which I think we dealt with earlier, that being the phasedown of the San Juan and Rodman Naval Stations. The second item has to do with reductions in civilian personnel with a resultant saving of $6.1 million. How much of the savings due to reductions in civilian personnel is attributable to the phasedown of the San Juan and Rodman facilities? Would you please outline the other areas where civilian personnel have been reduced?

Captain BOYKIN. Included in the $6.1 million reduction in civilian personnel costs, $0.5 million is related to Naval Stations Rodman and San Juan. The greatest savings in personnel costs for these stations occurred between fiscal years 1971 and 1972. Other areas where personnel reductions are reflected are in the air bases of the Atlantic Fleet $1.6 million; other naval stations of the Atlantic, $1.5 million; the Pacific Fleet air bases $1.3 million; and other stations in the Pacific Fleet, $1.2 million.

REDUCTIONS ON MATERIALS, SERVICES AND CONTRACTS

Senator YOUNG. A rather substantial reduction of $4 million in operating costs for materials, services, and contracts is reflected and I wonder if you would explain the nature of the contracts and services reduced and how these reductions were effected? I presume that this

saving is over and above those resultant from the San Juan and Rodman phasedown.

Captain BOYKIN. These reductions were effected by reducing or terminating contracts primarily in the data processing area for contracted in-house automatic data processing services, and for equipment rental no longer required due to procurement of equipment. Also, a contract for engineering analysis on the EB–47 aircraft was reduced. These reductions are in addition to those realized at San Juan and Rodman.

NONSCHEDULED SHIP REPAIRS

Chairman ELLENDER. I notice that you are no longer requesting funding for ships operations and I presume that this is because of the inactivation of the one ARL–30 that you had last year. What puzzles me is that, despite this, there is an increase in nonscheduled ship repairs "of $1.2 million up from $3 million in fiscal year 1972." Your description of what the increase is for indicates that the "nonscheduled ship repairs" is a bit of a misnomer. What else is included in this category?

Captain BOYKIN. These resources provide for the operating and emergent maintenance repair funds for craft assigned to special warfare groups and amphibious commands, for example SEAL teams, underwater demolition teams as well as maintenance support for floating drydocks and heavy lift cranes.

Chairman ELLENDER. Would you please explain to the committee what projects are included in nonscheduled ship repair and how much is requested for each?

Captain BOYKIN. Sir, the $4.2 million fiscal year 1973 request consists of two parts, first $2.9 million for operating and maintenance cost of approximately 182 craft assigned to amphibious commands. These funds relate to the $3 million specified in fiscal year 1972. The increase of $1.2 million over the fiscal year 1972 level is for the overhaul of one medium auxiliary drydock for $900,000 and two heavy lift salvage cranes for $340,000.

SPECIAL COMBAT SUPPORT FORCES

Senator YOUNG. Would you please explain to the committee what action you took in order to effect the reduction of $4.8 million in your Special Combat Support Forces? It represents a reduction of approximately 20 percent and I would be interested to know how you will do it.

Captain BOYKIN. This decrease will be effected by a reduction in the average number of months deployed and a reduction in resources in support of overhaul and maintenance effort of construction equipment and replacement of equipment for deployed battalions.

AIRCRAFT OPERATING COSTS FOR TRAINING

Chairman ELLENDER. With regard to the aircraft operating costs associated with training, you show the slight increase of $400,000 as being the result of a $0.9-million increase related to fuel price increases that are offset by a $0.5-million decrease due to the change in the mix of aircraft. In the sentence preceding, on the top of page 1–2–10, you

indicate that the flying program will support fewer flying hours in 1973 than in 1972 and I cannot understand why another reduction doesn't result for this reason. Would you please delve into this a bit and explain why a reduction is not reflected?

Colonel BJORKLUND. The $0.4-million aircraft operating cost increase is better described as an increase fuel cost of $0.9-million and a net $0.5 million decrease due to flight hour reduction and change in mix of aircraft. The $0.5-million decrease results from a $1.2-million increase due to change in mix of aircraft and a $1.7-million decrease due to the reduction of 9,681 flying hours.

Chairman ELLENDER. Can you also give the committee an idea of the number of aircraft you are speaking of that are used in this training or are these particular aircraft part of your regular force structure?

Colonel BJORKLUND. This budget request supports an average of 608 aircraft for fleet replacement training in fiscal year 1973 compared to 638 in 1972.

FLIGHT OPERATIONS SUPPORT COSTS

Senator YOUNG. On page 1–2–11, regarding flight operations support costs, I notice that your request is $100,000 below that of last year, despite the fact that civilian personnel costs are included in this category and despite the raise in civilian pay. Either civilian personnel are not a substantial factor in the budget for this activity or you have made some healthy reductions.

Colonel BJORKLUND. While there are civilan personnel costs in other areas of this budget program, there are none included in the aircraft operating and support costs category. The reduction of $100,000 for aircraft operating in this budget program is due to a reduction in flying hours from 15,357 in fiscal year 1972 to 12,441 hours in fiscal year 1973.

LCU OVERHAUL

Chairman ELLENDER. I have no questions with regard to aircraft operations and support but I do concerning ship operations and repairs. To begin with, I notice that the estimate for this activity that you provided last year when you were before us was quite a bit lower than the estimate for fiscal year 1972 that is indicated in the justification for 1973. If I am not mistaken the amount before us last year for 1972 was $2.4 million as against a revised estimate of $3 million in the present justification book. Would you please explain this difference?

Captain BOYKIN. The increase of $0.6 million is for the overhaul of four more LCU's returned from Vietnam.

SERVICE CRAFT OVERHAULS

Chairman ELLENDER. The cost of ship operations increases even more in fiscal year 1973 over the revised estimate for 1972. The figures are on page 1–2–11 and indicate an increase of some $800,000, which is due to an increase in service craft overhauls. Earlier we spoke of the overhauling of ships and the costs and I wonder why the costs of overhauling these service craft are in this program and not in the one we discussed earlier, I believe it was in regard to ships forces. How many fleet service craft are operated and maintained with these funds

and, if this is a request for funding for commands, why are these craft needed? Please be as specific as possible.

Captain BOYKIN. There are 148 service craft operated and maintained with these funds in the command program. The only reason these craft are financed in this program is because the service craft are assigned to the various commands as their responsibility for more central control. Boats such as patrol craft, utility landing craft, and floating drydocks are included in this program.

CONSTRUCTION BATTALION SUPPORT

Senator YOUNG. Turning now to the item for construction battalions, I notice that the original 1972 estimate is considerably less than the revised estimate in the justification book for this year. Specifically, what is the reason for this increase?

Captain BOYKIN. The increase of $1.7 million in the fiscal year 1972 construction battalion support in the command program was necessary because the original budget base was understated. The increase is required for such items as conversion to contract messmen and increased redeployment travel costs.

Senator YOUNG. The 1973 estimate for construction battalion support, while less than the revised estimate for 1972, is still more than originally requested. How much more than was originally requested for fiscal year 1972 is the 1973 request and what are these funds requested for?

Captain BOYKIN. The amount requested for construction battalion support in fiscal year 1972 was $1.6 million, so that the fiscal year 1973 request of $3.1 million is a $1.5 million increase over fiscal year 1972 as requested last year. The increase is a net figure consisting of a decrease of $0.2 million and increase of $1.7 million for such items as conversion to contract messmen and increased redeployment travel costs.

INCREASES FOR CIVIL OPERATION AND RURAL DEVELOPMENT SUPPORT

Chairman ELLENDER. It appears that you made some cuts in your general operating expenses but that a sizable portion of the amount cut was restored; I want to inquire into the add-ons that result in this partial restoration. Part of the offset is due to "increases for civilian personnel pay raises, health benefits and personnel for civilian operations and Rural Devolopment Support in MACV, $0.9 million." How much of this $0.9 million increase is due to civilian operations and rural development support?

Captain ABERCROMBIE. The increase for Civil Operation and Rural Development Support is $361,000.

Chairman ELLENDER. Would you please explain to the committee what these civilian operations are and why an increase is required for them?

Captain ABERCROMBIE. The civil operations and rural development support program, under the single managerial direction of the Commander, U.S. Military Assistance Command, Vietnam, is responsible for providing military and civil support of pacification in Vietnam. This consists of a coordinated military and civil process to restore public security, initiate political, social and economic development, extend Vietnamese Government authority, and win the support

of the people. The increase is required to support an additional 14 man-years at the headquarters which is funded by the Commander, U.S. Military Assistance Command, Vietnam, under Budget Activity 2.

Chairman ELLENDER. With regard to the Rural Development Support in MACV, I cannot understand why this request appears at this point in the budget request. I thought this sort of request was consolidated in Budget Activity 10—Support of Other Nations. Would you please explain to the committee why this request is a part of the unified and operational commands request and not under Support of Other Nations? In your explanation, would you indicate how much of the $0.9 million increase is for this purpose and what the funds are to be used for?

Captain ABERCROMBIE. The Civil Operations and Rural Development Support is not a separate activity, but an integral part of the Military Assistance Command, Vietnam headquarters, which is funded from Budget Activity 2 as a unified command. The increase requested here is $316,000 for support of 14 civilian man-years previously funded by the Department of the Army.

ADP EQUIPMENT IN KOREA

Chairman ELLENDER. With regard to the automatic data processing program in Korea, for which you are requesting an increase of $400,000, would you explain what this increase is to be used for and why it is needed at this time?

Captain ABERCROMBIE. Comusforces Korea does not currently have automatic data processing capability. The number of reports and volume of data required to prepare these reports is such that automation is necessary to fulfill assigned tasks. The requirement for ADP support was validated and approved by the Joint Chiefs of Staff on November 12, 1971.

The requested $400,000 is for development of software, personnel and other support required to implement the Comusforces Korea ADP proposal.

Chairman ELLENDER. To provide a bit of background on this request, would you please indicate for the record how much of the total request is for automatic data processing in general, in unified and operational commands, and in Korea specifically?

Admiral SPREEN. I will do that.

(The information follows:)

O. & M.N. FOR AUTOMATIC DATA PROCESSING

[In millions of dollars]

	1971	1972	1973
Total Navy Department	146.9	148.1	158.8
Unified and operational commands	9.3	8.8	9.0
Command, U.S. Forces, Korea	0	0	.4

FLEET COMPUTER PROGRAMING CENTERS

Senator YOUNG. In the general statement of the purpose and scope of the work of the unified and operational commands that is found on page 1–2–11, support for fleet computer programing centers is included.

Would you please tell the committee how many of the centers there are, where they are located, and how much of the total request for unified and operational commands is earmarked to support them?

Captain BOYKIN. There are two fleet computer programing centers, Atlantic and Pacific, located at Dam Neck, Va., and San Diego, Calif. There is $7.7 million included in fiscal year 1973, for these facilities.

Senator YOUNG. With what I understand to be a push toward centralized programing and control over this sort of activity, I am a bit surprised to find that there are fleet computer programing centers. Would you reconcile this for me, please?

Admiral SPREEN. The two fleet computer programing centers (FCPC) are the central design/programing activities for tactical systems for the Pacific and Atlantic Fleets. They are colocated with the fleet antiairwarfare training centers where they share equipment, thus eliminating duplicative overhead and equipment requirements.

To insure program commonality between the fleets, each FCPC is tasked to provide support for an entire ship class regardless of its parent fleet. Additionally, the two FCPC's serve as a backup for the other in the event of natural disaster or loss due to hostilities.

Effective July 1, 1972, as a further effort to centralize control of this type activity, the FCPC's will continue to be physically located with the fleets but command and direction of their efforts will emanate directly from the Office of the Chief of Naval Operations.

MARINE MAINTENANCE OF GROUND SUPPORT EQUIPMENT

Chairman ELLENDER. Almost a million dollars is added in this request for the functional transfer from the Marine Corps for maintenance of ground support equipment. What ground equipment are you referring to here and why is it that it is being transferred from the Marine Corps' custody or support?

Captain BOYKIN. Sir, the funds transferred provide for the maintenance of such items as aircraft tractors, liquid oxygen generator sets, crashtrucks, runway sweepers, and miscellaneous vans. Maintenance support of this equipment is the responsibility of Navy and resources were erroneously transferred in fiscal year 1971, at the time of the transfer of Marine Corps air station support from O. & M., Navy to O. & M., Marine Corps.

Chairman ELLENDER. I am certain that the Marine Corps has made an offsetting adjustment in its request to reflect this transfer but would you please confirm for the record the amount of that adjustment by the corps?

Captain BOYKIN. Yes, sir; this transfer is reflected in the Operation and Maintenance, Marine Corps appropriation; $0.9 million was transferred to Navy Budget Activity 2—General Purpose Forces, and $0.4 million to Budget Activity 7—Central Supply and Maintenance.

MEDITERRANEAN MISSILE EXERCISES

Chairman ELLENDER. Under unified and operational commands, you have an item of increase for missile exercises in the Mediterranean. How much is specifically for this purpose? What is the nature of these missile exercises? Are they part of the normal training program or are

they part of some command sponsored exercise? How much is already provided in the budget for these missile exercises for which you need this additional funding?

Captain BOYKIN. [Deleted.] In fiscal year 1972, $84,000 was included in the budget but the requirement has doubled for fiscal year 1973 making the cost of the range $178,000. These additional exercises are required in view of the extreme importance in maintaining a high state of operational readiness.

1972 INCREASES FOR UNDERSEA SURVEILLANCE PROGRAM

Chairman ELLENDER. I wish you would explain the increase in the 1972 revised estimate as given in the 1973 justification book. Last year your request was for $9.6 million for this activity in 1972. Now I find that the revised estimate for fiscal year 1972 is $10.5 million or an increase of $900,000. Specifically what accounts for this increase?

Captain BOYKIN. The fiscal year 1972 undersea surveillance program was increased $0.9 million to cover the costs of services provided to the naval facility by the U.S. Air Force prior to their moving out of Eleuthera, Bahamas.

UNDERSEAS SURVEILLANCE FACILITIES

Senator YOUNG. Of the total amount requested, $5.4 million is for the operation and maintenance of facilities as well as for some other purposes. Would you please indicate to the committee what these facilities are and where they are and how much of this total is for the operation and maintenance of these facilities?

Captain BOYKIN. The base operations total of $5.4 million is almost exclusively for the direct operation and maintenance of the facilities. The travel and per diem amount to approximately $0.2 million and the civilian personnel salaries, which are necessary for the operation total another $0.2 million. The facilities are required to operate and maintain the Navy's underseas surveillance system. The facilities and their location are as follows: [Deleted.]

CAESAR EQUIPMENT

Chairman ELLENDER. Would you also please discuss what the purpose of this system is and how the Caesar equipment fits in the overall picture?

Captain BOYKIN. [Deleted.]

Chairman ELLENDER. How many personnel, both civilian and military, are involved in this operation/system?

Captain BOYKIN. In the undersea surveillance system there are 22 civilian personnel and 2,818 military personnel end strength for fiscal year 1973.

1973 EXERCISES

Chairman ELLENDER. The justification indicates that the Navy will be participating in nine exercises during fiscal year 1973. Would you please provide the committee with a list of these exercises, indicating where each will take place? Are the missile exercises in the Mediterranean that we discussed earlier included in this listing?

Captain BOYKIN. The missile exercise is not one of these nine exercises. I will provide a listing of the nine joint exercises.

(The information follows:)

Exercise

Deep Furrow/Express—Joint/combined NATO Fleet Exercise to exercise NATO plans in the southeastern region.)

Hal Con Vista—[Deleted.]

Exotic Dancer—(To train and evaluate the capability of assigned forces to conduct military operations within the area of responsibility assigned to the Atlantic Command.)

Unitas—(To gain experience and training in ASW and combined operations in conjunction with naval and air forces of South America countries.)

Flintlock—(A series of underwater exercises conducted in EUCOM.)

High Heels—(To exercise the implementing and reporting procedures required for execution of general war.)

Black Star—(A joint CPX to rehearse USSOUTHCOM Contingency plans.)

Aloud-Series—(Joint communications exercises to train communications elements and to exercise DCA and commercial circuitry in support of LANTCOM.)

Strong Express—(A major NATO exercise (LIVEXTEAM series) in Southern Atlantic and Europe for Naval control of shipping entailing sea and air operations, STRIKE Fleet operations, amphibious operations, including landings, (CINCLANT, SACLANT, CINCHAN, SACEUR).)

BUDGET ACTIVITY 3; INTELLIGENCE AND COMMUNICATIONS

Admiral MINTER. This budget activity finances operations of the Navy's Cryptologic; Intelligence including Mapping, Charting and Geodesy; Communications; Oceanography and Weather programs and Special Support Activities.

These special functional programs are performed in response to national security tasking and to provide specific specialized information and services required for fleet operations.

1972 APPROPRIATION AND 1973 BUDGET REQUEST

The fiscal year 1973 request of $313.6 million for these programs is $17.5 million above the fiscal year 1972 level of $296.1 million.

The consolidated cryptologic program provides funds in direct support of the national cryptologic effort and the fleet-commanders-in-chief. The fiscal year 1973 request is $31.6 million which reflects a $4.5 million increase over the fiscal year 1972 level of $27.1 million, primarily for new equipment installation and to satisfy the National SIGINT requirement directed by the National Security Agency.

Chairman ELLENDER. Admiral, I understand that there have been some consolidations made according to a letter I received some time ago from Mr. Laird. How does that affect your intelligence activities?

Admiral MINTER. These have not yet been completed. I think you are talking about the Investigative Service combination, sir.

REDUCTION OF ACTIVITIES

Chairman ELLENDER. Last year this committee reduced Intelligence requests by about $372 million. How much of that amount was deducted from any of your activities in the Intelligence field? If you do not have the figure available, I wish you would provide it for the

record. We have asked that of the other services. If your program has been affected, moneywise, where did you make the reductions? Please include the itemized funding and personnel reductions.

Admiral MINTER. All right, but I would like to be sure I understand precisely what you want. My understanding is that you want two things. You would like to know how we took the cut that was effected last year—and I think we have this information and can provide it—and second you also want to know how the reorganization affects us for the 1973 budget.

Chairman ELLENDER. Yes. The reduction in money and personnel. That was the purposes of the reduction.

Admiral MINTER. The consolidation has not fully taken place yet, but we will make every effort to get you what you asked for.

The overall reduction is $25,000,000. The breakout by appropriation follows:

[In millions]

	GDIP	CCP	Total
O. & M.N	4.5	2.0	6.5
OPN	1.0	6.0	7.0
MPN	1.5	8.0	9.5
R.D.T. & E		2.0	2.0
Total	7.0	18.0	25.0

The Secretary of Defense has directed the establishment of a consolidated Defense Investigative Service (DIS) to handle all personnel security investigations (PSI's) for the DOD. The DIS will be established through a transfer of resources from the military investigative agencies (in the case of the Navy, from the Naval Investigative Service). Some transfers will occur between April 1 and September 30. The process is to be fully completed by October 1, 1972. The precise scope of DIS operations—and, hence, the volume of resources Navy will lose—have not yet been finalized. Current prospects are that DIS operations will be confined to the States, the District of Columbia, and Puerto Rico. Should this be so, it would appear that some overall savings in PSI costs can be anticipated—and that the resources that NIS will transfer to it will be no greater than the workload that will also be transferred. Under this approach a transfer of around 740 personnel—civilian and military—is anticipated. This development, together with reductions necessary to live within our fiscal year 1973 budget request for NIS—around 30 to 40 man-years of effort—will leave the NIS around 710 people to meet its world-wide responsibilities in counter-intelligence and criminal investigations. (This contrasts with the almost 2,100 personnel on board in early fiscal year 1970.) This base will be entirely too small to meet the anticipated criminal and counterintelligence workload. Further, it will create problems in personnel rotations and career development. It will entail increases in travel time and cost, lower productivity, and an increase in reaction time, since we must reduce our operational locations from around 200 to a little more than a hundred. Our operational flexibility will be markedly less with this small organization.

It remains to be seen whether the anticipated savings in PSI costs from the creation of the DIS are or are not counterbalanced by these indicated costs increases in other investigative and counterintelligence operations. It is reiterated that this will be a transfer of resources—from Navy to Defense.

GENERAL DEFENSE INTELLIGENCE PROGRAM

Chairman ELLENDER. Proceed.

Admiral MINTER. The General Defense Intelligence program, GDIP, includes funds for Naval Technical Intelligence Center; intelligence data handling systems; mapping, charting, and geodetic operations, and several other intelligence activities and programs.

The fiscal year 1973 request for the GDIP is $102.6 million, a $4.3 million net increase from the fiscal year 1972 level of $98.3 million. The increase provides improved capability to fleet commanders in highly specialized sensor areas and in the undersea warfare effort.

INCREASE FOR FLEET TACTICAL INTELLIGENCE SUPPORT

Chairman ELLENDER. On page 1–3–5, you indicate that the $1.5 million increase for fleet tactical intelligence support over the revised 1972 estimate is "necessary to achieve a slightly higher level of operation than in fiscal year 1972 primarily for 10 additional man-years, more deployments and additional support costs associated with these increased capabilities." I would like you to be more specific for the record on these increases. Would you please break down for the committee the cost of the additional man-years, of the additional deployments, and of the additional support? Would you at the same time please explain to the committee why these additional man-years are needed and specifically what they will be engaged in? How many additional deployments are you referring to in this regard and how much of the increase requested is for this purpose? How much of the increase requested is for additional support for these operations and how much is already in the budget for support costs of the nature of those you are requesting increases for?

Admiral HARLFINGER. FTISG was established to proved a capability totally responsive to fleet commanders' requirements in highly specialized sensor areas for important and unique fleet collection programs but, due to funding levels, this group has not attained its full potential. FTISG deploys technical and analytical personnel and equipment to support airborne, surface and subsurface sensor collection requirements; provides on-scene intelligence processing; and produces integrated all-system, all-source, intelligence analyses. FTISG currently has four vans which can be moved to or are located in forward areas. These vans contain Electronic Intelligence (ELINT), Acoustic Intelligence (ACINT), PHOTO and [deleted] analytical equipment for providing on-scene quick-look analysis. Fixed facilities at Keflavik and Rota have also been improved to support operations in those locations.

During 1972, civilian personnel and equipment had to be deployed from the Washintgon area, usually on very short notice. Timeliness of support and economics have dictated that support personnel be located permanently on-scene. Plans are to establish military teams, train them, and locate them in forward areas along with the support equipment. This will significantly reduce the need to deploy personnel from the Washington area and will provide the fleet commander with analytical skills with which he can perform necessary functions not now being carried out. In addition, COMNAVINTCOM will have a team of experts in the field that are capable of fully exploiting the highly technical sensor equipment. The project will allow for increased support to the fleet such as support of Cluster Bear East, Bear Trap, Housecall, Silver Fox, IL–38 collection and others that are being developed any time they are deployed rather than occasionally. FTISG will support Cluster Bear West (which has recently been established in the Pacific area), newly developed electro-optics sensors, and heli-

copter sensor systems. The support of these new systems and full support of the older sensor systems will require twice as many deployments in fiscal year 1973 or approximately 30 deployments. The total increase will be for these deployments as the entire budget, with the exception of the $900,000 for the SparCom contract, is devoted to responding to fleet requirements in highly specialized sensor areas.

Intelligence Data Handling Systems

Chairman Ellender. In regard to the intelligence data handling systems, I notice that your original and revised 1972 estimates are quite close, but that you are requesting an increase of almost $1 million in 1973. Your justification for this increase is that it "consists of rents and utilities for third generation computer upgrading; annualization of rental costs * * * for a medium scale computer and annualization of the classified pay raise." Would you please indicate how much of the requested increase is for each of the items mentioned in your justification?

Admiral Harlfinger. The largest element in the dollar increase is $654,000 for the Intelligence Data Handling System Communications switch in Hawaii, through which intelligence data from Washington is received and distributed to users in the Pacific area. Annualization of the civilian pay raise accounts for $97,000. Other increases cover rental of a medium scale computer at CINCLANT ($191,000—This computer is currently the subject of adjustment to the OPN account as part of the Worldwide Military Command and Control System (WMCCS) buy), operation of the 360/30 computer at the Fleet Intelligence Center, Pacific Facility, and external assistance for COMUSMACV ($42,000).

Upgrading of Computers

Chairman Ellender. As I recall, we provided funding for the lease of two new computer systems of the third generation variety and one new medium computer in the 1972 appropriations and yet, now you are back for more to upgrade these and provide for greater rents and utility costs. I would have thought that these costs would have been provided for in your last year's request. Would you please explain precisely why this upgrading is needed and why it wasn't included in the original budget request?

Admiral Harlfinger. The Navy's plan for processing of Ocean Surveillance data included the application of dedicated computers and communications for a worldwide system. To reduce the cost of such a system, a revised, scaled down version is being implemented, taking advantage of existing hardware upgrading equipment where possible, thereby reducing the need to employ dedicated computer equipment for OSIS.

In addition the fiscal year 1972 appropriation provided only for partial year support to the computer systems and did not include funding for the OSIS requirement at fleet headquarters.

We consider that the OSIS (ocean surveillance information system) is also an example of substantial and valuable intelligence return on a reasonable investment.

The Defense Science Board on Ocean Surveillance concluded that, in an era of diminishing U.S. Navy seagoing forces, a responsive OSIS could buy dramatic increases in operational capability for a modest investment. The purpose of OSIS is to insure that our fleet commanders and national authorities are constantly updated [deleted] OSIS is designed to prevent the possibility of the hidden and secret movement of a naval force. Thirty years ago an undetected carrier task force destroyed Pearl Harbor. OSIS is guarding against another "Pearl Harbor" in an era in which a surprise attack could include a vast nuclear missile launch from submarines. It is guarding against another *Pueblo* being surprised and captured. The OSIS concept includes strategically located facilities to provide timely information to fleet commands and national authorities. The hub of the OSIS is the Navy Ocean Surveillance Information Center (NOSIC) at Suitland, Md., where all-source data is received and processed on a worldwide basis. The NOSIC maintains the worldwide data base on the [deleted] and keeps the national command and control authorities and fleet commanders informed. The subordinate OSIS facilities at Norfolk; London; Rota, Spain; Pearl Harbor and Kami Seya, Japan [deleted].

The whole system is controlled through dedicated teletype circuits linking the centers and facilities. High-speed data transfer is used between the NOSIC at Suitland and the center at Norfolk; and circuit testing is underway for higher data rate exchange between Suitland and Pearl Harbor. Projected actions include completion of communications circuitry to accommodate a 4,800-bit/second exchange throughout the system, installation of data-capable communications terminals at all facilities, and upgrading of the processing capabilities at Norfolk, Pearl Harbor, London, and Suitland. All OSIS processing will be accomplished using available computer hardware of the WWMCCS and IDHS. This will result in sizable savings in development and operating costs, by eliminating the need for OSIS dedicated computers.

The system is evolutionary and is growing in a satisfactory and economical manner. The major OSIS installations will be collocated with designated WWMCCS sites; and, through compatibility of the two systems, it will be possible to introduce information available through OSIS directly into the WWMCCS. Through this relationship, the national command structure can be assured of vital intelligence obtained through OSIS.

The OSIS data base is continually expanding as more sensor information is supplied to the system. [Deleted.] This increasing and dynamic data base on targets on, over, and under the world's seas will provide the significant indications of possible impending attack, and help to prevent *Pueblo* incidents or Pearl Harbor attacks.

Mapping, Charting and Geodesy

Chairman Ellender. Proceed.

Admiral Minter. In the mapping, charting and geodesy segment of the GDIP, funds are provided for chart production and distribution facilities of the Naval Oceanographic Office, the Navy's satellite geophysics project, one magnetic survey aircraft, and six hydrographic

survey ships which support fleet operations and also respond to statuatory requirements to provide navigational materials for mariners in general.

Four of these ships are dedicated to support the strategic forces with navigational data. The remaining two ships conduct surveys to support priority coastal chart requirements of CINCLANT and CINPAC.

Naval Communications Program

In the Naval communications program, funds are requested for the operating costs of the Navy communications system, procurement of leased communications services, and the installation/automation of communications equipment at Naval shore activities, worldwide.

For fiscal year 1973, $130.7 million is requested for this program, an increase of $5 million over the fiscal year 1972 total of $125.7 million.

This increase includes $1.5 million for leased communications resulting primarily from higher tariff and subscriber rates; $1.1 million for automation of communications stations; $0.9 million for operation of tactical and fleet, satellite communications; and $1.5 million related to continued installation of new communications equipment, escalation costs of fuel and utilities, worldwide transmission improvement, currency revaluation, and the recent classified pay raise.

Omega Navigation System

Senator Young. When the Omega system, which the Navy is building, is completed, will this be used by aircraft?

Admiral Minter. Yes, sir. We are phasing out our military requirement for Loran A, and Omega will replace that.

Senator Young. You have another system it will not replace. Will Omega be the only system you have?

Admiral Minter. In some patrol airplanes, that is correct. It will be the primary electronic navigation system in some airplanes. The Omega would be the principal system used as opposed to the Loran.

Senator Young. How does the accuracy and dependability compare with the inertial navigation system?

Admiral Minter. The inertial system is good; about 1 nautical mile per hour in our patrol aircraft. You can update that with the Omega system and limit the accumulated error to 1 to 2 nautical miles in a long, 10 to 12 hour mission.

Omega gives us instantaneous position information. Interial navigation systems also gives you that, but we recognize the fact that there is a certain amount of precession involved in this. As was indicated, over a period of time, inaccuracies creep into it.

Admiral Feightner. I think maybe I can clear up the confusion. I believe the Air Force is looking for a system in which they can drop bombs accurately. The Omega system is not accurate enough to drop bombs and hit the target. It is not that accurate. It is accurate to within 1 to 1½ miles.

Senator Young. I understand that the C–5A aircraft have inertial units. Each costs approximately $100,000. These can be replaced by two Omega systems with greater accuracy units costing about $70,000 each. These are the figures the manufacturer gave me.

Admiral FEIGHTNER. They can have a system where one can check the other, but they still need updates. They must be updated periodically. There is no inertial system yet developed that has zero errors over a period of time.

Senator YOUNG. I understand, when an aircraft leaves a base, the further it flies out, the more the accuracy decreases.

Admiral FEIGHTNER. That is correct. But you can fly over a certain geographic position and take out the errors in the system, update it, and it is accurate for another period of time. You can do that by getting a reading from Omega station which will be accurate within a mile or a mile and one-half.

FREQUENCY AND RANGE

Senator ALLOTT. Is the Omega system low frequency?

Admiral FEIGHTNER. It is essentially a very low frequency system.

Captain BROCK. It is in the range of 10–14 kilocycles and it was originally designed for under ice polar work in the submarine community, and its application has been since extended.

LORAN NAVIGATION SYSTEM

Senator ALLOTT. What are its advantages over the Loran system?

Admiral MINTER. Greater accuracy than Loran A. There are to be eight Omega stations total, and when they are all installed you will have pretty much worldwide coverage, and that is not true with Loran. There are large areas of the ocean where Loran does not give us any coverage.

Senator YOUNG. I understand, if it is used by a merchant ship, the merchant ship could save from 200 to 300 miles by maintaining a more direct course.

Admiral MINTER. Yes, it gives you a greater degree of accuracy.

Admiral FEIGHTNER. The receiver is fairly low cost, which is another big advantage. It is a more reliable piece of equipment.

INTELLIGENCE AND COMMUNICATIONS

OCEANOGRAPHY PROGRAM

Admiral MINTER. Funds in the Oceanography program provide for the collection, processing, analysis, and publication of acoustic, geophysical, and other oceanographic data to support U.S. Naval operating forces as well as scientific and maritime needs.

Funding also includes operation of the Naval Observatory. $25.4 million is requested for the Oceanography program in fiscal year 1973, reflecting an increase of $0.7 million for essentially a level program.

The majority of the oceanograph effort directly supports antisubmarine and undersea warfare programs. With increasing sophistication of our ASW weapon system and decreasing noise-level of Soviet submarines, knowledge of all parameters of the oceanographic environment are becoming more critical to effective ASW operations.

NAVAL WEATHER SERVICE PROGRAM

The Naval Weather Service program provides the operating forces with a complete environmental information service including a full

range of weather and oceanographic forecasting services and climatological studies for operational commanders.

The fiscal year 1973 estimates of $7.4 million reflects a net increase of $0.3 million to enhance satellite data collection capabilities.

Specialized Support Activities

The specialized support activities for which funding is requested are the Naval Command Systems Support Activity, the Department of Defense Computer Institute and Defense-Navy War Games.

The fiscal year 1973 estimate of $15.9 million reflects an increase of $2.7 million over the fiscal year 1972 estimate of $13.2 million, providing an increase in support for the Worldwide Military Command and Control systems automation program.

Chairman Ellender. I presume that all of our services are equipped to utilize this communications system?

Admiral Harlfinger. Yes.

Chairman Ellender. There is no duplication in the construction of any of these communication systems?

Admiral Harlfinger. It is very well handled.

Intelligence and Communications

Consolidated Cryptologies Program

Chairman Ellender. On page 1–3–2, the cryptologic program budget reflects an increase of some $4.5 million, which you indicate is "primarily for installation of cryptologic equipment and to satisfy the national Sigint operational tasking levied against Navy by the Director, National Security Agency." Would you please explain to the committee what new equipment is being installed and where, and why it is necessary that it be installed at this time?

Admiral Harlfinger. The equipment to be installed is the Improved AG–22 Terminal System. It will be installed at the [deleted] Naval Communications Station Spain, Rota, Spain, Naval Security Group Activity, Homestead, Fla., plus training positions at Naval Communications Training Center, Pensacola, Fla. The equipment will be received from the manufacturer in fiscal year 1973 and the installation of this automated system will improve the processing of collected data.

Senator Young. How much of the total $31.6 million requested is for installation of cryptologic equipment?

Admiral Harlfinger. $2.649 million.

National Sigint Operations

Senator Young. How much of the $4.5 million increase requested is for the national Sigint operational tasking levied against the Navy and precisely what is to be accomplished with these funds?

Admiral Harlfinger. All of the $4.5 million increase is either directly or indirectly in support of national Sigint tasking. The increase will be apportioned to these claimants as follows:

Naval Security Group Command, $2.499 million for antennas maintenance, transportation rate increase for AR/FCOS billings, pay raises for graded civilians, operations costs for four additional FLR–15 equipments for the Bullseye system and operations costs of IATS communications.

Naval Electronics Systems Command, $1.752 million for pay raises for graded civilians and equipment installation costs.

Bureau of Naval Personnel, $0.269 million for pay raises for graded civilians and increased utilities costs and facilities maintenance expenses.

Senator YOUNG. Are there other funds in the total request for the cryptologic program, aside from this increase for Sigint, that relate to Sigint or other National Security Agency work that the Navy might do for the Agency?

Admiral HARLFINGER. Yes, all Navy dollars in the CCP are directly or indirectly responsive to the operational and technical control of NSA, whether it be for fulfillment of the national oriented collection mission or for direct support to operational commanders.

GENERAL DEFENSE INTELLIGENCE PROGRAM

Chairman ELLENDER. Moving now to the general defense intelligence program, I notice that here the originally submitted budget for 1972 was for $95.4 million, and that, despite reductions by the committee before the 1972 appropriations bill passed, the revised estimate for fiscal year 1972 as shown on page 1–3–3 of this year's justification is $98.3 million—an increase of almost $3 million. Would you please explain this increase in detail?

Admiral HARLFINGER. The originally submitted budget for fiscal year 1972 was $95.4 million. However, this submission was revised to accommodate the January 11, 1971, classified pay raise. This change was after the budget books were printed. The actual fiscal year 1972 submission reviewed by the appropriations committee was for $98.5 million. I will place in the record the detail tracing of the many changes which normally take place each fiscal year.

(The information follows:)

[In thousands of dollars]

	Intelligence	Mapping, charting and geodesy	GDIP total
Fiscal year 1972 col fiscal year 1972 budget	49,476	45,888	95,364
Jan. 11, 1971 classified pay raise	+1,891	+1,248	+3,139
Revised fiscal year 1972 col fiscal 1972 budget	51,367	47,136	98,503
Wage Board pay raise		+347	+347
Navy rebalancing action	+2,350		+2,350
Drug abuse program	+225		+225
Foreign currency revaluation	+31	+13	+44
Increased Government share health benefits	+27	+22	+49
Civilian grade de-escalation	−148	−193	−341
Transfer to GSA		−38	−38
Fleet adjustments	+77	−24	+53
January 1972 classified pay raise	+991	+634	+1,625
Congressional reduction	−2,350	−2,150	−4,500
Fiscal year 1972 col fiscal year 1973 budget request	52,570	45,747	98,317

Note: The classified and Wage Board pay raises themselves account for a $5,100,000 increase somewhat offset by the $4,500,000 congressional reduction. Among the other changes was a Navy reprograming action adding $2,350,000 for undersea warfare and related programs.

1972 CHANGES IN FLEET TACTICAL INTELLIGENCE SUPPORT

Chairman ELLENDER. You indicate that the area of fleet tactical intelligence support will have the greatest increase in fiscal year 1973.

In addition to the increase over the revised 1972 estimate, there is $900,000 difference between the original 1972 estimate and the revised estimate that I wish you would explain in detail to the committee. Precisely what is included in that increase?

Admiral HARLFINGER. The additional $900,000 is requested to fund contract with Sparcom, Inc., to provide the Naval Intelligence Command engineering, technical, and other specialized services, including personnel, material, and facilities. These services will afford a capability to perform fully integrated, all-source, indepth intelligence analyses of selected Soviet naval operations. They will also provide topical studies of the naval warfare doctrine and tactics demonstrated therein. This capability does not currently exist elsewhere. Until it can be accommodated inhouse, programing for the capability must be continued.

DRUG ABUSE RELATED TO INTELLIGENCE

Senator YOUNG. On page 1–3–6, in regard to the counterintelligence and investigative activities, I notice that you are requesting an increase of approximately $900,000 and that half of that is for the classified pay raise. The other half is attributed to the increased emphasis on the drug abuse program and I would like you to tell the committee what part the Navy counterintelligence and investigative activities program plays in this overall problem area. Would you indicate in your explanation how much of the total requested in this program is related to this problem?

Admiral HARLFINGER. You asked, one, what role the Naval Investigative Service plays in the Navy's overall program to deal with drug abuse, and, two, how much of the requested resources for the Naval Investigative Service is for drug abuse-related matters.

The Naval Investigative Service has essentially only an investigative role in narcotics and drug abuse cases. We say essentially because it also spends a comparatively very small amount of time giving lectures and briefings to naval personnel on the dangers of drug abuse. About one-half of the criminal investigations performed by the Naval Investigative Service are on narcotics and drug abuse cases. All such investigations are in response to requests from Navy and Marine Corps commands. Investigations are not opened on naval personnel who, as users or possessors of narcotics or drugs, voluntarily seek rehabilitation under the Department of the Navy drug exemption program. That program, which began in July 1971, appears to have resulted in a reduction in the number of narcotics and drug abuse investigations commands have asked the Naval Investigative Service to perform. While the reduced workload in this area has been largely offset by substantial reductions in investigative manpower, it is hoped that the funds requested for increased emphasis in this area will permit the Naval Investigative Service to mount an aggressive program of identifying drug pushers within the Navy as well as investigating individual cases of usage or possession not falling within the exemption program. An aggressive investigative program would involve such things as the expenditure of funds for narcotics "buys," stakeouts by investigative personnel to observe narcotics transactions, and a considerable investment of investigative time per case.

Currently, about one-third of the total effort of the Naval Investigative Service is devoted to criminal investigation. As noted above, about one-half of that is devoted to narcotics and drug abuse investigations. Thus, it is estimated that roughly one-sixth of the funds and associated man-years of effort requested for the Naval Investigative Service will be devoted to this problem. In round numbers, this translates to approximately $3.8 million and 210 man-years of effort. It should be emphasized that those figures are approximations only, as no cost figures have been computed for narcotics investigations. It should be noted that the Naval Investigative Service conducts a wide variety of investigations, and that the computation of cost figures for individual categories of cases would be prohibitive in terms of administration and related costs.

Imagery Personnel Increase

Chairman Ellender. In the field of imagery, for which you are requesting an increase of $950,000, you indicate that this increase is for the hire of 41 additional personnel plus the annualization of the civilian pay raise. I realize the sensitive nature of the activities carried on by this group and the need for proper personnel staffing to do the job but an increase of 41 sounds large. Would you please explain to the committee why these 41 additional personnel are needed at this time? In your explanation, please indicate the present staffing of the program, both military and civilian, giving the grades and number in each grade for the civilian personnel and, since I presume that the additional personnel requested are civilian, the number in each grade of the 41 additional personnel requested.

Admiral Harlfinger. The additional 41 personnel will be utilized in scientific and technical (S. & T.) imagery exploitation, undersea warfare (USW) operations, electro-optical analysis, and digital image processing areas.

I will provide a statement for the record explaining the need for these additional people.

(The information follows:)

Thirteen additional personnel are required in the S. & T. imagery exploitation program. Six of these 13 are among the below listed present staffing. They were funded in fiscal year 1972 with reprogramed funds under the emergency USW program, but there are no funds available to pay them in fiscal year 1973 unless approved herein. The other seven are not yet on board, but are vitally needed to provide for adequate exploitation of naval weapons and weapons systems. No other organization exploits imagery on these weapons. If the Naval Reconnaissance and Technical Support Center (NRTSC) cannot do the job, there will exist vital gaps in our knowledge of the characteristics and capabilities of these weapons.

	Present staffing	Additional personnel
Civilian [1]	1 GS–15	
	1 GS–14	
	2 GS–13	
	8 GS–12	
	17 GS–11	2 GS–11.
	8 GS–9	2 GS–9.
	2 GS–7	2 GS–7.
	5 GS–5	1 GS–5.
	2 GS–4	
Military [2]	5 officer	No increase.
	29 enlisted	

[1] Total present staffing, 46; additional personnel, 7.
[2] Total present staffing, 34; additional personnel, no increase.

Four additional personnel are required in USW operations. NRTSC supports this program by exploiting imagery; by conducting research and development to improve optics, cameras, and television devices; and by training operators. This program has never been afforded adequate manpower to provide the intelligence necessary to the S&T community, the research and development (R. & D.) community, and national level decisionmakers.

	Present staffing	Additional personnel
Civilian [1]	2 GS–12	
	2 GS–11	1 GS–11.
	3 GS–9	2 GS–9.
	1 GS–7	1 GS–7.
Military [2]	1 officer	No increase.
	1 enlisted	

[1] Total present staffing, 8; additional personnel, 4.
[2] Total present staffing, 2; additional personnel, no increase.

Sixteen additional personnel are required in the electro-optical analysis program. Eight of these are in the below listed present staffing. They were also funded in fiscal year 1972 with reprogramed funds under the emergency USW program, but again there are no funds available to pay them in fiscal year 1973 unless approved herein. The number of Soviet naval ships which are available for collection efforts as well as the use of electro-optical systems has greatly increased. It is vital to know the characteristics and capabilities of these systems. There is not now an analysis capability in the Navy that can more than marginally analyze this huge quantity of complex images, tapes, and recordings. Eight of the 16 additional personnel are not yet on board, but are extremely necessary to provide the required capability to analyze the huge mass of data resulting from electro-optical collection systems. If the characteristics and capabilities of these important weapon systems components do not become known, the R. & D. community will not have the information necessary to develop countermeasures and successful offensive weapons.

	Present staffing	Additional personnel
Civilian [1]	1 GS–14	
	2 GS–13	1 GS–13.
	3 GS–11	1 GS–11.
	2 GS–9	3 GS–9.
	5 GS–7	3 GS–7.
	1 GS–4	
Military	2 officers	No increase.

[1] Total present staffing, 14; additional personnel, 8.

The remaining eight additional personnel are required in the digital image processing program. Four of these eight are among the below listed present staffing. They, too, were funded in fiscal year 1972 with reprogramed funds under emergency USW program, but again no funds are available in fiscal year 1973 to pay them unless provided herein. [Deleted.]

The four people not yet on board are needed to provide sufficient manpower to operate the complex and costly digital image analysis system.

	Present staffing	Additional personnel
Civilian [1]	1 GS–14	
	2 GS–13	
	2 GS–12	
	2 GS–9	2 GS–11.
	1 GS–7	2 GS–9.
	2 GS–5	
	1 GS–2	
Military	None	None.

[1] Total present staffing, 11; additional personnel, 4.

OTHER PERSONNEL INCREASES

Chairman ELLENDER. With regard to the last six programs listed in the table on page 1–3–4, I am surprised to find that the increases, by and large, are for additional personnel. The intelligence production program is requesting 5 civilian man-years; special intelligence communications, one additional position; intelligence management and support, 11 additional positions; and the technical sensor collection program, 9 additional man-years. Considering the personnel reductions that are taking place in the Department of Defense overall, I am a bit surprised and hope that you will explain to the committee just why these additional people are needed. In each case please indicate the number of personnel already involved in the particular activity and indicate the grade or grades and positions, of the personnel you are requesting.

Admiral HARLFINGER. The additional man years in intelligence production are to augment an existing 24-hour, 7-day per week operation at the Naval Ocean Surveillance Information Center (NOSIC) at Suitland, Md. There is an onboard complement of 46. The additional five were authorized for fiscal year 1972 and are being phased into this fiscal year due to budgeting limitations. As a result, 5 man-years are reflected in fiscal year 1973 over fiscal year 1972. The five personnel concerned are: 2 GS–3, intelligence assistants; 2 GS–5 intelligence assistants; and 1 GS–7, intelligence analyst.

The one additional position in special intelligence communications is for a qualified planning and resources management analyst to formulate and manage the Navy position of the special intelligence communications program element (Spintcomm). At present, one chief communications technician is employed on Spintcomm budget and programing matters full time and a GS–13 on a part-time basis. The plan is to assign a GS–11 to this position.

Of the 11 additional positions for intelligence management and support, three are required for upgrading the staffing of all policy-type CNO, JCS, and interagency intelligence committees. These are 1 GS–13, 1 GS–12, and 1 GS–11. The increased use of cover and deception techniques has been endorsed by the Navy's fleet commanders in chief and numbered fleet commanders as desirable and necessary. For this function two additional personnel are planned—1 GS–12 and 1 GS–11. There is a requirement for one additional professional, a GS–11, to provide support in the exchange of intelligence information between the United States and friendly foreign naval powers. Three positions, 2 GS–13's and 1 GS–12, are required in the technical sensor areas of electrooptics, nuclear radiation, and microwave radiometry. These personnel would provide management of these technical collection assets from inception in the research and development stages through their introduction and deployment by the fleet. Two additions are required for the Production and Dissemination Operations Division—1 GS–12 and 1 GS–11. The GS–12 will establish scientific and technical liaison between Navy S. & T. producers and all other DOD S. & T. agencies. The GS–11 will task and monitor general intelligence requirements for fleet support to include direct support efforts of Naval Scientific and Technical Intelligence Center and Naval Reconnaissance and Technical Support Center production tasking.

The 9 additional man-years for the technical sensor collection program are to provide analysis and management for the expanded undersea warfare intelligence program. Required are: 1 GS–15, intelligence research analyst; 1 GS–14, intelligence research analyst; 1 GS–13, equipment specialist; 1 GS–12, budget analyst; 1 GS–11, security specialist; 1 GS–5, intelligence specialist; and 3 GS–4, clerical assistants.

TECHNICAL SENSOR COLLECTION

Senator YOUNG. In the technical sensor collection area, I notice that a part of the increase requested is for contract assistance "to provide new data analysis procedures to identify the open ocean antisubmarine warfare threat and a study of new sensor requirements for intelligence collection operations." What I would like to know is how much is being requested for this contract assistance and why does this sort of thing have to be contracted out in the first place? Is there no "inside" group that can perform the necessary studies for you? I wish you would explain.

Admiral HARLFINGER. In fiscal year 1973 we are requesting $293,000 for external assistance contracts, an increase of $258,000. Past experience as well as strong recommendation from the ocean surveillance panel review of undersea warfare (USW) intelligence, dictate the need for a combined analytical and technical approach with the broadest possible perspective. The necessary quantitative analytical skills as well as the technical engineering skills are not resident within technical sensor group. The contracts being requested are for one-time studies which are not of a continuing nature. It is felt that it is not economical to hire civilians for short-term studies. The integrated technical and analytical expertise required for this analysis does not exist inhouse and such resources would not be readily available elsewhere within the Navy. In addition to quantitative and technical expertise, the desired analysis must include elements of cost, developmental risk, and technological design. The nonavailability of appropriate multidisciplined inhouse expertise and the desire to capitalize on existing advanced methodologies to achieve an optimized integrated collection suit consistent with our real needs (and no more) from the basis for contractor-supported analysis.

This need for external assistance reflects the complexity of the technical intelligence collection and processing task we face in light of the recent and rapid expansion of the Soviet Navy. We are confronted in virtually every major ocean area by modest Soviet units loaded with advanced electronics equipment and bristling with missile armaments. Egypt and India have destroyed enemy ships with the Soviet-provided STYX missile, yet newer missiles are now in the Soviet fleet. [Deleted.]

COMMUNICATIONS

Chairman ELLENDER. The original 1972 budget request for communications was $123.5 million but the revised estimate as given on page 1–3–9 of the 1973 justification reflects an increase in this of $2.1 million to $125.6 million. Would you please indicate for the committee what areas are affected by the increase and specifically what the increases were for?

Admiral HARLFINGER. The increases occurred in the station operations and equipment installation areas. Increases in station operations totaled $1.3 million and were for graded and wage board pay raises +$0.9 million and currency revaluations +$0.4 million. The increase of $0.8 million in equipment installation was for wage board and graded pay raises.

RATE INCREASE

Chairman ELLENDER. The justification for Communications is for an increase of $5.05 million; $1.7 of which is attributable to leased communications, $3.1 to station operations, and $3.03 to equipment installation. The increase for leased communications is said to be because of the increased tariff and subscriber rates for Autovon leased services. Would you please explain how these rates are determined and allocated to the services?

Admiral HARLFINGER. Autovon subscriber rates are currently determined by the Defense Communications Agency (DCA) and are subject to approval by the Assistant Secretary of Defense (Telecommunications). The rates are calculated based on Military Department forecasts of service requirements (number of access lines and the type of service, precedence, and the degree of world access required for the lines) and on DCA estimates of total backbone costs for a system capable of providing the requisite service. For fiscal year 1973 Autovon service, a revised basis for calculation has been promulgated which, in effect, recognizes the differing distribution of network cost inherent within differing distribution of network cost inherent within the Conus, Caribbean, European, and Pacific areas. Although the Navy's approved access line configuration has not changed materially, application of the revised subscriber rates result in an increase cost to Navy totaling $1.7 million.

GAO REPORT ON LEASED COMMUNICATIONS SERVICES

Chairman ELLENDER. In a recent GAO report, B–169857, Benefits from Centralized Management of Leased Communications Services, the GAO indicates that the procedures used by DOD to control the extent and use of leased communications services might be improved. I do not know how much of the criticism in the report is aimed at the way the Navy handles things but I would like to hear your comments on the report after you have had a chance to go over it. Specifically, I would like to know how great you think the problem is in the Navy?

Admiral HARLFINGER. Most of the criticism contained in the GAO report related to specific examples other than Navy. Further with respect to Navy, the report acknowledged the centralized review of all telecommunication requirements at departmental level and that procedures were being formulated for periodic reviews. During our previous review of the report we expressed the belief that the searching and frequent program, budget and apportionment reviews of leased and other communications requirements in itself constituted an adequate centralized management review process and that individual services are in a better position to assemble the necessary data for such reviews. Thus another centralized detailed management level as proposed by the report is, to a degree at least, redundant, would tend to

inhibit urgent reaction to operational requirements and would be difficult to support from a cost effectiveness standpoint. More recently, the ASD(T) response to the report tends to support this view. In short, I do not believe that we have a large problem within the Navy in controlling the extent and use of leased communications. This view is substantiated by the content of the report itself.

Chairman ELLENDER. The GAO seems to feel that part of the problem is due to the lack of formal accounting for communications systems. To what extent does this problem exist in the Navy and what are you doing to gain control of it?

Admiral HARLFINGER. The GAO report concedes that their review had revealed a greater visibility of total DOD communications costs over the last 3 years due to what I refer to as more definitive PPBS categorization. Likewise, I believe that there will be better accounting records as accounting procedures "catch up" and conform to further PPBS definition refinement, indeed we are taking action to do just this. I confess, however, that I cannot realistically see the necessity for an accounting review system visibility sufficiently detailed to track items costing as little as $6 per year. I believe that ASD(T)'s comments on the review are appropriate in this regard. "Although decentralized telecommunications management may entail risks and there may be errors committed, there is no assurance that centralized authority, per se, resolves all leased telecommunications management problems. A centralized validation office would duplicate necessary validation functions existing within the Military Departments and the Defense Communications Agency."

COMMUNICATIONS STATIONS OPERATIONS

Senator YOUNG. The increase for station operations is to provide for "Automation of Communication Stations Operations, and expansion of an interim operational capability of Tactical Satellite Communications, and continued support of the Naval Security Group Activity at the Naval Receiver Facility Naval Communication Station, Japan." Would you please indicate for the committee how much of the increase requested is for each of the above enumerated items and how much of the total request is for each?

Admiral HARLFINGER. The increase requested for each of the above items is as follows:

Automation of Communication Stations, $1,055,000; Expansion of Tactical Satellite Communications, $900,000, and Support of Naval Receiver Facility Naval Communication Station, Japan, $260,000.

The amount of the total request for each of the above items is:

Automation of Communication Stations, $3,900,000; Tactical Satellite Communications, $980,000, and Naval Receiver Facility Naval Communication Station, Japan, $853,000.

AUTOMATION OF COMMUNICATIONS STATIONS

Chairman ELLENDER. Looking back at last year's justification, I find that an increase of $6.1 million was requested for almost the same items that you are requesting this $3.1 million for this year. What is more, in last year's testimony, in the prepared text, Admiral Minter stated,

"Initial and one-time costs associated with our communications automation program account for a significant portion of the $6.1 million increased funding requested * * *." I am afraid that I do not understand this seeming duplication of one-time costs and hope that you will clear it up for us?

Admiral HARLFINGER. The initial development of software for the automation of Communication Stations is planned to take place over a 3-year period. Approximately a $1 million increase is being requested in fiscal year 1973 over an approved base of approximately $2.9 million in fiscal year 1972, for a total of $3.9 million in fiscal year 1973. These funds represent the one-time costs for the development of different portions of a single modular program which should be completed in the fiscal year 1974–75 time frame. Maintenance of this software will be a recurring annual cost.

Chairman ELLENDER. Would you please tell the committee when you expect the automation of these communications stations to be complete and how much you expect the total cost of this conversion to be?

Admiral HARLFINGER. The present plan calls for completion of the automation of these facilities in fiscal year 1977. The cost of this conversion is expected to be approximately $24.6 million.

Chairman ELLENDER. Please furnish the committee with a list of the stations being automated.

Admiral HARLFINGER. The list of stations to be automated will be submitted for the record.

(The information follows:)

Test Bed, Washington Navy Yard
Chief of Naval Operations Telecommunications Center (TCC)
CINCIANT TCC
Crystal Plaza TCC
Camp Smith TCC
Naval Communication Station, Norfolk, Virginia
Makalapa TCC
Naval Communication Station, Italy
Naval Communication Station, Guam
Naval Communication Station, San Diego
Naval Communication Unit, London
Camp LeJeune TCC
Naval Communication Station, Honolulu
Treasure Island TCC
Charleston, S.C. TCC
Jacksonville, Fla. TCC
Suitland, Md. TCC
Kunia TCC
Naval Communication Station, Newport
Subic Bay TCC
New Orleans TCC
Whidbey Island TCC
Boston TCC
Long Beach TCC
Great Lakes TCC
Philadelphia TCC
Okinawa TCC
Naval Communication Station, Rota
Nimitz Hill TCC
Roosevelt Roads TCC

AUTOMATION SAVINGS

Chairman ELLENDER. As a result of this automation program, do you expect there will be a saving in the operational cost of the stations, or is the conversion being affected simply to make the stations

more efficient and more responsive for the same dollars spent? If there is a projected saving, would you please furnish the figure for the record?

Admiral HARLFINGER. The principal reason for the automation program is to make the stations more efficient and responsive in the handling and processing of communications. An economic analysis for the conversion of the first nine stations revealed an approximate saving of $21.4 million over an 8-year economic life. This figure includes military pay and allowances as well as O. & M.N. savings. The approximate saving of $21.4 million is the discounted value of the total systems cost calculated in accordance with DOD Instruction 7041.3 of February 26, 1969, subject: Economic Analysis of Proposed Department of Defense Investments.

TACTICAL SATELLITE COMMUNICATIONS

Senator YOUNG. Inasmuch as the operational capability of the Tactical Satellite Communications was on an interim basis last year as well as this year, would you please indicate to the committee if and when permanent accommodations would be made for this activity? Please explain.

Admiral HARLFINGER. The operational capability of the Tactical Satellite Communications (TACSATCOM) system will remain on an interim basis. The satellites in this system, LES–6 and TACSAT–1, are primarily research and development models. The Fleet Satellite Communications system is scheduled for an initial operational capability in [deleted]. This system will be the UHF SATCOM system follow-on the joint TACSATCOM program.

COMMUNICATIONS EQUIPMENT

Chairman ELLENDER. With regard to equipment installation, I see on page 1–3–11 that you are requesting another $9.9 million for fiscal year 1973. This is in addition to $9.6 million provided in 1972 and $9.4 million provided in 1971. This appears to be a large amount for simply installing equipment. Would you please explain exactly what these funds are for and why continual financing is required for this purpose?

Admiral HARLFINGER. This funding supports the installation of new communications systems as well as reconfiguration, modernization, and consolidation of existing systems. New weapons systems and sophisticated command and control developments demand improved speed, reliability, security and capacity of information exchange. To meet these demands we must constantly improve the naval communications system through the introduction of new technological developments such as satellite and automation. For these reasons, I anticipate that the need for equipment installation funding will not only continue but will increase in future years.

OCEANOGRAPHY INCREASE

Chairman ELLENDER. I see that there is an increase of $700,000 for the oceanography program which you attribute entirely to the annualization of the classified pay raise. That seems rather large to me and I wonder if you could confirm that for us?

Admiral MINTER. The increase of $700,000 in fiscal year 1973 is due to a number of plus and minus factors. The increase due to classified pay-raise is $637,000.

TACTICAL AND STRATEGIC ASW OPERATION

Senator YOUNG. On page 1–3–11 of the justification, you indicate that there is a minimum requirement [deleted] for survey work in support of tactical and strategic ASW operations [deleted]. I realize that this is highly sensitive but what portion of the amount you are requesting in the oceanography program is associated with that requirement?

Admiral MINTER. The fiscal year 1973 request of $25.4 million for oceanography, includes $8.6 million associated with surveys to support tactical and strategic ASW. This includes the costs of the scientific parties embarked on the survey ships and the data reduction, as well as ship operating costs.

Senator YOUNG. Do you expect that this requirement will grow in the future and therefore require more funding?

Admiral MINTER. I expect the requirement to grow as acoustic systems become more sophisticated in their use of the ocean environment, and with possible increased ASW emphasis [deleted]. More funds would be required to meet this future requirement when identified.

Senator YOUNG. Of the seven oceanographic survey ships, how many will be directly involved in the ASW survey work that you refer to?

Admiral MINTER. Three ships are completely dedicated to this effort.

NAVAL WEATHER SERVICE

Chairman ELLENDER. On page 1–3–12, in dealing with the Naval Weather Service, you indicate that the $300,000 increase in this request is the net effect of a classified project, annualization of the classified pay raise, and reduced flying hours. Would you please break this down to indicate the increases and decreases for each?

Admiral HARLFINGER. To provide for the operation of the classified project $627,000 will be required. Annualization of the classified pay raise is plus $81,000, off set by a reduction of $370,000 in flying hours.

CLASSIFIED PROJECT INCREASE

Chairman ELLENDER. Would you please explain the reason for the increase in the classified project? What is the total in the request for this project?

Admiral HARLFINGER. These funds will be used to implement the Navy portion of an approved joint service project which will become operational in fiscal year 1973. This classified project was approved subsequent to the fiscal year 1973 POM; consequently, no previous year O. & M.N. funding is indicated. The total requirement for this project is $627,000.

1972 CHANGES

Chairman ELLENDER. Here again we have a substantial difference between the original fiscal 1972 estimate and the revised 1972 estimate found in the fiscal year 1973 justification. The original estimate was

$12 million and the revised estimate is $13.2 million. Would you please reconcile this difference for us?

Captain ABERCROMBIE. The reconciliation of original fiscal 1972 estimate to revised 1972 estimate is as follows: Fiscal year 1972 original revised for pay raise, $12,447,000; civilian health benefits, $6,000; classified pay raise, January 1972; $215,000; and contract support, $566,000.

AUTOMATION PROGRAM

Senator YOUNG. With regard to the automation program, would you please outline what this program is, what you hope to accomplish by it, and how much it will cost? In providing the cost information, please indicate the cost per installation and also the overall cost by element.

Admiral SPREEN. The additional O. & M. funds requested for the naval command support activity are for software conversions associated with the implementation in the fiscal year 1972–73 of the worldwide military command and control systems (WWMCCS) ADP program. Through the centralized procurement of the WWMCCS new standard computers the following benefits are expected:

1. Significant reduction in the duplication of efforts associated with hardware and software acquisition, development and maintenance.
2. Increased effectiveness and a reduction in cost of logistic support through standardization of equipment, maintenance procedures and economical ordering.
3. Standardized reporting procedures, formats, data elements and codes.
4. A coordinated program of system development through configuration management control.
5. Centralized support of the nonfunctional and selected standard functional software.
6. Improved personnel utilization through common training, standardization of equipment, procedures and operating system software.

O. & M. funds requested will be utilized for software for the Chief of Naval Operations, Commander in Chief Atlantic/Commander in Chief U.S. Atlantic Fleet, Commander in Chief Pacific, Commander in Chief U.S. Pacific Fleet and Commander in Chief Naval Forces Europe.

DEFENSE COMPUTER INSTITUTE

Chairman ELLENDER. Within the increase of $49,000 for the Defense Computer Institute you indicate that two additional instructor man-years of effort are provided for. Would you please explain why these 2 additional man-years are necessary? What is the reason for instructor personnel in this organization anyway?

Captain ABERCROMBIE. The additional man-years will allow the conduct of three new ADP courses on a regular basis to meet the requirements of the DOD. The new courses security of ADP operations, ADP system analyses and design, and data processing installation management are scheduled for commencement in fiscal year 1973. The Department of Defense Computer Institute, established by DOD Directive 5160.49 under the executive agency of the Navy, provides computer orientation courses which are designed to acquaint senior

military and civilian DOD executives with the application, operation, and selection of digital computer systems.

War Gaming

Chairman Ellender. With regard to war gaming, I see on page 1-3-14 of the justification that you are requesting $23,000 less in fiscal 1973 than in 1972. You state in your explanation that the $23,000 is the net effect of a reduction in program offset by a transfer of $50,000 from budget activity 9. Would you please tell the committee the reason for the transfer?

Captain Abercrombie. When funds were transferred from R.D.T. & E. and placed in program F the category Defense/Navy war games was established. As the mission of the Strategic Analysis Support Group is to assist the Deputy Chief of Naval Operations in the conduct of war games analyses of planned naval operations, it appeared that this cost would be more proper in program F—budget activity 3 than budget activity 9.

Budget Activity 5—Naval Reserve

Chairman Ellender. Proceed.

Admiral Minter. The Naval Reserve program totals $136.1 million, an increase of $17.2 million over fiscal year 1972.

This budget activity supports the Naval Reserve—air, surface, and subsurface. It provides for the operation and maintenance of 58 Naval Reserve Force ships, an average of 739 Naval-Marine Air Reserve operating aircraft, Naval Reserve training centers, air stations, and facilities.

This budget activity also supports the training of 129,000 men and women in the Selected Reserve. Of these 129,000 personnel, 29,000 are in the Combat Unit Component; organized and training in units and available for recall with their equipment. The remaining personnel are training in units to support Active Force expansion and augmentation in the event of contingency recall or full mobilization.

Reserve Flight Training Program

In the Reserve flight training program we are requesting $26.3 million to support 283,000 flying hours. The increase of $2.3 million over fiscal year 1972 is a result of modernization of the Reserve Force aircraft. At this same flying rate the Naval Air Reserve Forces made significant increases in their combat readiness in the past year including carrier requalification of the pilots in the two attack air wings and two ASW air groups.

The increase of $17.2 million will provide additional operating funds for both the air and surface programs, increase of eight ship overhauls, and increased civilian personnel salaries.

Chairman Ellender. I presume additions are made in order to improve the capability of our Reserve Forces, in line with Secretary Laird's program to increase the readiness of our reserve forces.

Admiral Minter. Yes. We have additional ships and aircraft going into Reserves this year. This is a fairly substantial increase in the total Reserve program, sir.

Naval Air Reserve

Chairman Ellender. On page 1–5–2 of the justification, you show that the Naval Air Reserve request is for about $400,000 more than was requested last year. The followup data, however, indicates that there are some sizable variances within that slight increase. Specifically the increase of $2.7 million for Naval Aviation Reserves is justified because of the high performance aircraft and an increase in flying hours. Would you please provide the committee with a list of the new aircraft coming into the Reserve inventory?

Admiral Minter. Both the Naval Reserve and the Marine Corps Reserve will receive substantial numbers of modern aircraft during fiscal year 1973. I will provide the number of each type for the record.

(The information follows:)

Naval Air Reserve Forces.—18 F–8J; 12 A–7A; 6 P–3; 2 C–118; 7 A–4E; 3 KA–3; 2 E–1B; and 1 RF–8G.

Marine Corps Air Reserve.—35 A–4E; 6 CH–53; 3 UH–1E; and 2 AH–1G.

Naval Air Reserve Reorganization

Chairman Ellender. Also in the justification, you indicate that a new organizational structure was completed in 1972, and I would like you to tell us about it. Essentially, what I would like to know is why you needed to reorganize and what you hope to achieve by it, but most importantly, I would like to know what effects this will have on the funding required to maintain these reserve forces?

Admiral Minter. Before July 1970, the Naval Air Reserve consisted of units comprised of Selected Reserve pilots, ground officers and enlisted men. They were trained by a cadre of active duty personnel at a naval air station. The aircraft were assigned to the station and were flown by Navy and Marine Reserve units in turn on different weekends. On mobilization two or more units were to join together to form a squadron. Not only was there a shortage of aircraft and ground support equipment to provide for these squadrons upon recall but the number of active duty personnel assigned was inadequate to provide the highly trained nucleus essential for initial operation. In 1968 several units were recalled during the *Pueblo* crisis. Their equipment was inadequate and as a consequence their level of training was low.

As a result of the lessons learned in the recall, the Navy reorganized its Air Reserve into a force consisting of two carrier attack wings, two carrier ASW groups, 12 land-based ASW patrol squadrons, and three transport squadrons. All were patterned after active duty Navy squadrons and equipped with combat serviceable aircraft. A nucleus of active duty personnel was ordered to each squadron which is headed by a selected Reserve commanding officer. These new, self-sufficient squadrons are now deploying aboard aircraft carriers or to fleet bases during annual 2-week cruises. Their performance has been very good. They no longer need to rely on shared equipment or temporary personnel from a parent station.

In order to achieve required readiness, the number of flying hours per pilot is greater, and the cost of supporting the inventory of aircraft in condition for rapid deployment is higher. Future plans call for

continued modernization of aircraft and equipment as Active Forces are reduced or new aircraft enter the fleet. Increases in funding will be needed to operate these more capable aircraft and maintain the state of readiness required in the Air Reserve.

Aviation Depot Maintenance

Senator Young. With the increase in the number of high performance aircraft that you anticipate in fiscal year 1973, I am a bit puzzled by the decrease estimated in aviation depot maintenance. It seems contradictory to have the inventory of high performance aircraft increase and the maintenance decrease. Would you please reconcile this for us?

Admiral Feightner. The number of aircraft required to be reworked decreased from fiscal year 1972 because the mix of aircraft to be reworked within the reserve inventory were such that fewer individual aircraft are due for fiscal year 1973 rework.

It is true that the types of aircraft in the naval aviation operating, research, reserve, and training inventories are increasingly complex. This situation, coupled with the increasing age of the inventories, tends to force maintenance costs higher each year. However, the Naval Air Systems Command has actively pursued management improvement programs and a plant equipment modernization program to partially offset the increasing aircraft maintenance costs.

The Navy prepared the fiscal year 1973 budget based on the assumption that productivity gains (due to new plant equipment and other improvements) would be made in 1973 and that the Navy would experience lower material costs in 1973. This resulted in a budget reflecting lower unit costs for reworking aviation equipment for both Budget Activity 7 operating and training inventories and Budget Activity 5 reserve inventories.

Naval Ship Reserves

Chairman Ellender. With regard to Naval Ship Reserves, I have to start by asking you to explain the differences between the original 1972 budget request and the revised estimate as provided in this most current justification book. Originally $16.4 million was requested for 1972 but the revised estimate for that year is now $19.7 million, an increase of $3.3 million. Please explain this increase.

Captain Boykin. The increase of $3.3 million provides for a restricted availability on three destroyers. These three destroyers were not scheduled for overhaul but certain repairs had to be accomplished to prepare for their summer operations.

Ship Overhaul Increase

Chairman Ellender. In addition to the increase just explained, another increase of some $10.6 million is requested, which you indicate is due primarily to the number of ships being overhauled. On page 1–5–4 of the justification you show the increase in the number of ships needing to be overhauled out of the Naval Reserve Training Fleet from two in 1971 to eight in 1972 and now to 16 in 1973. Can you explain the increase in this requirement? Isn't there some way these overhauls can be forgone for the present?

Captain BOYKIN. The fiscal 1971 program included one destroyer and one minesweeper; the fiscal 1972 program includes one destroyer and seven minesweepers; and the planned program for fiscal 1973 includes two destroyers and 14 minesweepers.

Reserve ships are cyclically scheduled for overhaul on the same basis as active fleet ships. This program maintains naval reserve ships in a satisfactory material condition so they can deploy with active fleet units. The big increase in overhauls is in the minesweeper area; from seven to 14 overhauls due to the increased MSO minesweepers force levels in the Naval Reserve Program. These minesweepers were transfered from the active fleet. If they had not been transferred to Naval Reserves, overhaul funds would have been requested in the active fleet overhaul area.

Chairman ELLENDER. Would you also give us an idea of the average cost of each of these overhauls over the 3-year period indicated? I have a feeling that the costs are rising but would like you to substantiate this.

Captain BOYKIN. For the destroyers the cost in fiscal 1972 is about $2.5 million and the estimate for fiscal 1973 is $3.1 million. For the minesweepers the estimate for fiscal 1972 is $318,000 and $347,000 for fiscal 1973.

The requirement in the destroyer area (one overhaul in fiscal year 1972 and two overhauls in fiscal 1973) is based upon the specific material condition of each destroyer. Specifically, the increase is required for structural hull repairs and machinery repairs.

Chairman ELLENDER. Where is the work to be done on the 16 ships planned to be overhauled in this coming year, and how much do you expect each to cost?

Captain BOYKIN. The two destroyer overhauls will be done in naval shipyards and the 14 minesweepers will be accomplished in private shipyards. The cost in each area is estimated as follows: Destroyers, naval shipyards, $6.2 million; and minesweepers, private shipyards, $4.9 million.

FUEL PRICE INCREASE

Senator YOUNG. In addition to the $8.8 million that is for the overhaul item, the remaining $1.9 million is said to be due to the increases in fuel prices and the operation costs of the six new ships being added to the fleet. Would you please break this down to show how much is being estimated for the price increase and how much is for the added operational expenses? At first glance it appears that the new ships might have higher operational expenses but perhaps a further breakdown will show that this is not the case. If these new ships do cost more to operate, I hope that you will explain this in your response.

Captain BOYKIN. The increase of $1.9 million in Naval Reserve ship operations is related to destroyers and minesweepers, as follows:

The fiscal year 1973 Reserve Force of 58 ships includes 31 destroyers. The replacement of older type destroyers with larger and more sophisticated types, accounts for a unit price increase of $32,000 per ship. In addition, an increase of 2 ship years of operating destroyers above the fiscal year 1972 schedule requires an increase of $462,000 in operational support.

The unit cost of minesweepers has not increased in these 2 fiscal years. However, two relatively inexpensive coastal minesweepers are inactivating and six additional minesweepers are joining the Reserve Fleet in fiscal year 1973. An increase of $422,000 is related to the change in types and the four additional ships.

A total of $164,000 is included in the $1.9 million for the fuel price increase.

BASE OPERATIONS

Chairman ELLENDER. Base operations is another area where the original 1972 estimate is much lower than the revised estimate. In this case the original estimate was $39.1 million, whereas the revised estimate is $40.6 million, or an increase of $1.5 million. Why is this?

Captain BOYKIN. The original estimate of $39.1 million did not include the January 1971 pay raise amendment. When you adjust for this and then add the January 1972 pay raise you will have accounted for the increase of $1.5 million.

Chairman ELLENDER. In dealing with the air support portion of base operations, I want to insert for the record the paragraph justifying these funds, which is an increase of $3.5 million over the revised 1972 estimate that appears on page 1–5–5.

(The information follows:)

This sub-program supports Naval Air Reserve Training at 6 Naval Air Stations, 9 Naval Air Reserve Training Units, 1 Naval Air Facility, 15 Naval Air Reserve Training Detachments, and 15 Marine Air Reserve Detachments. The net increase of $3.5 million in fiscal year 1973 will provide $4.2 million for the Navy's station support role at the Department of Defense Armed Forces Reserve Center, Los Alamitos, California; $.7 million for new messmen contracts at 5 Naval Air Stations; $.5 million for civilian pay raise and health benefits; and $.4 million for contracts and materials. There are offsetting decreases of: $1.3 million in civilian personnel costs; $.2 million for aircraft expense; and $.8 million for a lessened requirement for test and maintenance equipment to support new aircraft.

NAVY SUPPORT FOR AFRC LOS ALAMITOS

Chairman ELLENDER. Starting with the increases, would you please explain for the record how the Navy Reserve came to be the supporting service for this Armed Forces Reserve Center? In your response, please indicate what function Los Alamitos was performing prior to its being designated the supporting service. Would you also, regarding Los Alamitos, tell us how you arrived at the $4.2 million figure that you estimate it will cost to run the facility in 1973?

Admiral MINTER. The Secretary of Defense determined that the Navy should be the supporting service at AFRC, Los Alamitos. The Naval Air Reserve was assigned as the responsible command because it maintains the nonflying Naval Air Reserve training detachment and the present caretaker force, and also because it had familiarity with the facilities from prior management of the naval air station as a fully Active Reserve base. The $4.2 million required to activate and operate AFRC, Los Alamitos, was derived from comparing fiscal year 1970 historical costs when the base was in full operation with the requirements for support of various services who plan to locate there. Additional nonrecurring rehabilitation costs were based on a study of the present condition of facilities that will have to be occupied by tenants.

Messmen Contracts

Chairman Ellender. Second, I see that you are requesting an increase of $0.7 million for new messmen contracts at five naval air stations. Would you please explain to us why the request for funding for the Naval Reserve includes funding of this sort—funding that I would normally expect to find in the request for the Regular Forces?

Admiral Minter. The five naval air stations for which new messmen contracts were requested are Reserve air stations which are managed by the Naval Air Reserve and primarily support Reserve functions. Where Reserve Forces are located on regular Navy stations these functions are funded in the Active Force budget.

Chairman Ellender. How much is already in the budget, aside from this increase, for messmen contracts and how many stations are covered by this amount?

Admiral Minter. $82,000 is included in the budget for a messman contract at NAS New Orleans. This is the only messman contract currently funded at a Naval Air Reserve base.

Air Support Increase

Chairman Ellender. The last item I wish to inquire about in the air support area concerns the $400,000 additional request for contracts and materials. Would you please outline for the committee the nature of the contracts that you are requesting this specific funding for? Would you also please indicate how much is already in the budget for this sort of contract?

Admiral Minter. Contracts included in the additional funds requested are for increased costs of aircraft refueling, office equipment maintenance and rental, laundry and linen service, ADP rental, janitorial service, gas, water, electric, garbage collection, and grounds maintenance contracts. The fiscal year 1973 budget includes $2.4 million for this sort of contract aside from the requested increase.

Maintenance and Repair Deficiencies

Chairman Ellender. Moving now to surface/subsurface support. I see that you are requesting an increase of $2.7 million over the revised estimate for 1972 that you explained earlier. The largest part of this, $1.3 million, is to reduce maintenance and repair deficiencies. Would you please explain what you mean by these deficiencies, what they consist of and the reason they haven't been taken care of in the normal maintenance cycle?

Captain Boykin. The maintenance and repair deficiencies for the surface/subsurface program exist at Naval Reserve activities located throughout the Nation and include such items as roof repairs, exterior painting, heating, electrical, and plumbing repairs. Many of these repairs are of a safety nature. The validated backlog of essential maintenance and repair total $6,350,000. This backlog has been increasing because of underfunding of maintenance of real property for the surface reserve. For example, the "MRP" floor established for the surface reserve program for fiscal year 1972 was $1,679,000 whereas $2,450,000 is required to just maintain status quo. These facilities are located in

prime locations of the city and in many cases represent the only Navy activity in the city. The inadequate maintenance not only breaks faith with city fathers who provided these locations, but also acts as a deterrent to recruiting. The continued inadequate maintenance results in an ever increasing backlog of essential maintenance and repair.

Chairman ELLENDER. How much of the $17.8 million requested for surface/subsurface support is for the normal maintenance of facilities included in the "deficiency" category just referred to?

Captain BOYKIN. $2,450,000 is for normal maintenance of facilities, while $500,000 will be used to reduce the $6,350,000 backlog.

CIVILIAN PERSONNEL SUPPORT FOR SURFACE/SUBSURFACE SUPPORT

Senator YOUNG. Another $500,000 of the total increase for surface/subsurface support is for civilian personnel costs. Does that figure include funding for additional personnel or is it to provide for pay raises only? If there is more involved in this than meets the eye, please explain it to the committee.

Captain BOYKIN. The increase of civilian personnel costs includes additional personnel as well as pay raise costs. The end strength for fiscal year 1973 is 636 versus a fiscal year 1972 end strength of 593.

TRAINING SUPPLIES

Senator YOUNG. The final item mentioned concerning surface/subsurface support is a request for $900,000 for training supplies and services. Would you please tell the committee, first, how much is already in the project for this purpose; and second, exactly what this increase is needed to take care of?

Captain BOYKIN. In the fiscal year 1973 budget, there is $1,700,000 for training services, supplies and equipment. Of the $900,000 cited, $100,000 was for a utilities increase. The balance provides for supplies for training such as hand tools to implement practical factor training. Procurement is necessary to replace such training items as projection screens, flannel boards, and for procurement of such logistics support items as three position carousels used for the functional individual training system study. This increase is less than $2,500 per training activity.

BUDGET ACTIVITY 7. CENTRAL SUPPLY AND MAINTENANCE

Chairman ELLENDER. Proceed.

Admiral MINTER. This activity contributes directly to the readiness of deployed naval forces through financing operations of the Navy's supply system, centrally managed maintenance and overhaul programs and technical and engineering support to the fleet.

Maintenance and overhaul responsibility includes active fleet aircraft and support equipment, missiles, ammunition and repairable components for surface, subsurface, and aviation forces.

Funds requested are administered by the Headquarters and six Systems Commands of the Naval Material Command. The request in this activity is $1,859.6 million, a net decrease of $53.6 million from fiscal year 1972. This decrease is comprised of program reductions totaling

$99.2 million partially offset by $17.4 million for annualization of the January 1971 classified pay raise and two funding responsibility transfers of $28.2 million.

Program reductions are primarily related to reduced ship and aviation force levels. Other factors reflected in the reduced estimates include the continuation of productivity increases at naval aircraft rework facilities and the lengthening of maintenance cycles or time between overhauls for naval aircraft.

Examples of other reduced programs are supply system operations, transportation of technical and supply categories of material, and field operations.

The funding responsibility transfers are $21 million from Budget Activity 9 for reimbursement to the Department of Labor for Navy's portion of the employees compensation fund and $7.2 million from the R.D.T. & E. appropriation for operation of the Naval Training Devices Center, Orlando, Fla.

The Central Supply and maintenance budget activity is divided into seven major budget programs following the fleet support functional specialties of the Systems Commands. These programs are Air, Ordnance, Ship, Electronics, and Facilities Technical Support, Supply Support and Material Command and Support.

AIR SYSTEMS TECHNICAL SUPPORT

The air systems technical support program is budgeted at $728.7 million in fiscal year 1973. Within this program we have requested $498.4 million for the depot level overhaul and progressive rework of aircraft, engines, and their reparable components.

This request, together with $31.7 million for rework of Reserve aircraft in Budget Activity 5, and $20 million in reimbursements will provide $550.1 million to sustain the active inventory of 6,954 aircraft at current readiness levels.

The airframes portion of the rework of aircraft is programed at $198.3 million to support the average operating aircraft strength. Criteria such as age and/or individual model peculiarities generally govern the type and extent of rework the individual model receives.

Aircraft are scheduled for rework on a months-in-service tour basis depending on the type of aircraft and mission. The number of aircraft reworks to support fleet operations in fiscal year 1973 is 2,241 as compared with 2,337 in fiscal year 1972.

The engine program is based on the number of overhauls and repairs required to support the aircraft flying hour program with sufficient operable engines plus a minimum reserve pool.

Support of the fiscal year 1973 flying hour program of 2.7 million flying hours requires $91.6 million for the overhaul-repair of 6,856 aircraft engines on a regularly scheduled basis as compared with 7,094 engines in fiscal year 1972.

The component repair program is also based on aircraft flight operations. To support the fiscal year 1973 flying hour program $190.4 million is requested to rework 406,053 components, some 18,133 units below the fiscal year 1972 level.

Funding of $69.8 million is also requested in the aircraft reworks program for preservation of aircraft for shipment oversease, emer-

gency aircraft repairs, technical services for fleet activities, and the processing of material on a priority basis to relieve critical supply shortages.

REPAIR OF ENGINES

Chairman ELLENDER. To what extent do you contract for the repairs of engines?

Admiral MINTER. May I ask Admiral Feightner to address this. We do some overseas repair and rework in certain countries.

Admiral FEIGHTNER Approximately 20 percent of them are done in commercial overhaul.

Chairman ELLENDER. Abroad or within the United States?

Admiral FEIGHTNER. In all commercial, both here and abroad.

Chairman ELLENDER. You do some contractual work here in this country?

Admiral FEIGHTNER. Yes, we do. Approximately 20 percent of the work is done by industry.

Chairman ELLENDER. Is it more advantageous for you to do that than for you to use our own facilities?

Admiral FEIGHTNER. In most cases it costs us 25 percent more to do it commercially. However there are a few programs with some of our older aircraft where we have found it cheaper to do it commercially. They have established an expertise in this area and over a period of years they have gotten their prices down to where they actually do it cheaper on some of the older aircraft.

Chairman ELLENDER. The question came up with Reserves. All of the repairs to engines is done directly through the Navy.

Admiral FEIGHTNER. That is correct.

INTERSERVICE AIRPLANE REPAIR

Senator YOUNG. Does the Navy do overhaul work for any nongovernmental commercial interest any place in the world?

Admiral FEIGHTNER. No, sir. We do some of it for the State Department, on attaché airplanes, but that is all. We have none right now that we do any commercial work on.

Senator YOUNG. Do you do any work for the Army?

Admiral FEIGHTNER. We do a considerable amount of interservice work.

1972 APPROPRIATION AND 1973 BUDGET REQUEST

Admiral MINTER. For naval aviation support programs other than aircraft rework, $230.3 million is requested in fiscal year 1973. This represents a net decrease of $25.4 million from fiscal year 1972, generally associated with reduced fleet operations.

PROGRAM REDUCTIONS

Significant reductions are $8 million for rework of catapults and arresting gear, $7.5 million for second destination transportation of ammunition and aeronautical support equipment; $2.5 million for support of field activities performing inspection, maintenance, and engineering services; and $2.1 million for the rework and maintenance of air-launched weapons.

This latter program provides depot maintenance, fleet support, and engineering services for air-launched missiles, targets, ordnance and ammunition with the primary objective of maintaining weapons in a maximum ready-for-issue status.

Other aviation support programs include test equipment maintenance and calibration, inhouse and contract engineering services, missile stockpile surveillance, technical publications update, tactics evaluation, engineering support of air ASW equipments, and photographic and meteorological support.

Supply Support

Chairman Ellender. What does that consist of?

Admiral Minter. This is for the Naval Supply Systems Command.

Admiral Wheeler. This is for the support of our supply depots and our inventory control points worldwide.

Chairman Ellender. How is this related to the Navy Stock Fund operation?

Admiral Wheeler. The Navy stock fund is a revolving fund mechanism into which we pay back the money when we sell the material and it is reimbursed only for obsolescence or for a new procurement, and the new material that goes into it is generally procured under procurement appropriations. It is a revolving fund which holds in suspension that material that we use.

This appropriation is in connection with the operation of the facilities that hold our material, manage our material, and ship it and transport it and so forth.

Supply Depot and ICP Operation

Admiral Wheeler. $204 million is involved with the supply depot and ICP operation. $97 million is for the transportation of things; second destination transportation.

Chairman Ellender. From what source?

Admiral Davis. Primarily from supply centers to fleet customers who are principal users, and getting material distributed to the customers and high priority kinds of fleet needs.

Chairman Ellender. Do both military and civilian personnel operate these depots?

Admiral Minter. We have both, both civilians and enlisted personnel and officers at these depots. This is under Admiral Wheeler.

Chairman Ellender. Do any of these depots contain supplies that could be used by other services?

Admiral Wheeler. Yes. We also service other services and store for them, in certain aircraft programs for instance.

Chairman Ellender. Is that done on a reimbursable basis?

Admiral Wheeler. They generally pay for their own.

Servicewide Supply Functions

Admiral Minter. We are requesting $355.2 million under the supply support program for servicewide supply functions administered by the Naval Supply Systems Command.

This command has responsibility for supply centers and depots located in the United States engaged in the receipt, storage, and distribution of military supply items to meet fleet operating and material repair demands.

Also included are the operation of Navy Inventory Control Points engaged in the management of supply requirements and weapon systems support.

During fiscal year 1972 the inventory control points have achieved significant improvements in the return rates of electronic repairable items coming back for depot repair.

This improvement together with increased 1972 component repair funding budgeted under aviation, ship, ordanance, and electronics technical support programs has made a major contribution to fleet readiness through an increasing level of supply effectiveness in response to requirements of deployed ship and aviation forces.

Naval Supply Systems Command

Other responsibilities of the Naval Supply Systems Command include financing the intra-Navy movement of stock material and the transportation of military mail; port terminal services; Navy commissary store operations; and supporting activities and services.

The $355.2 million requested for supply support in fiscal year 1973 is a decrease of $21.9 million from the fiscal year 1972 funding level.

This decrease primarily reflects reductions in costs of transportation and operations of supply activities as the result of force level decreases, partially offset by increased funding requirements for the graded pay raise which became effective in January 1972.

MAINTENANCE AND LOGISTICS

Our request for all remaining programs is $775.7 million. These include maintenance and logistic programs other than aviation and supply and consist of ordnance, ship, electronics, and facilities technical support programs, and material command and support.

ORDNANCE TECHNICAL SUPPORT

We are requesting $227 million for ordnance related programs, a reduction of $12.9 million from fiscal year 1972. Our request is in support of four ordnance projects: conventional ordnance rework and maintenance, antisubmarine warfare systems rework and maintenance, surface missile systems rework and maintenance, and field operations.

The largest of these projects, conventional ordnance, is budgeted at $109.4 million in 1973. Through depot level repair this project provides the fleet with ready-for-issue ammunition and other shipboard ordnance, including guns and fire control equipment.

Additionally, supporting programs such as receipt, segregation, stowage, and issue of ammunition, quality evaluation, calibration, and explosive and weapons safety are funded here.

A reduction of $9.1 million in conventional ordnance rework and maintenance for 1973 is a result of generally lower operating forces.

Reworking and Reissuing

Chairman Ellender. When you say "rework," does that refer to required repair necessary to maintain operational condition?

Admiral Minter. Yes, sir. This is missiles. Missiles and conventional ordnance that go beyond a certain time have to be reworked It is taken back to the depots for rework, for reissue.

Ordnance Shelf Life

Chairman Ellender. Generally, what period of time elapses between procurement and need for rework?

Admiral Minter. It would vary with the type ordnance you are talking about.

Admiral Christman is here. Perhaps he can respond.

Admiral Christman. With respect to the explosives, which may be the thing you are talking about, that has an indefinite shelf life so normally we would not expect to take it back and remove the explosives and reload it. Some of the fuse components we do find—or some of the more sensitive detonators—do have shelf lives that range from 5 to 10 years, depending on fleet experience. Where we are observing duds we may set up a return program which will require, for those parts having a life problem, to bring them back and replace them.

Chairman Ellender. Are there any that become nonoperational?

Demilitarization Program

Admiral Christman. Yes, they do. They become nonoperational and too hazardous to rework. In that case we put them through a demilitarization program and attempt to sell the scrap.

Chairman Ellender. It is sold through you?

Admiral Christman. Yes. We are not permitted to give anything away.

Chairman Ellender. You sell the scrap directly?

Admiral Christman. That is sold by the services to the scrap dealers.

Chairman Ellender. Is that done on bid?

Admiral Christman. It is done by bid. We have a property disposal and at each activity we sell to the scrap dealers. They come in and make bids on lots of scrap.

Submarine System Rework

Admiral Minter. Our submarine system rework and maintenance effort is budgeted at $32.7 million, a reduction of $2.4 million from 1972. This funding supports the full range of antisubmarine warfare ordnance equipments.

The objective of this effort is to attain and maintain an acceptable level of ASW readiness in the active fleet.

Support funding is required to provide for development of corrective fixes for operational deficiencies of inservice ASW ordnance equipments; set up repair lines for new equipments such as the MK–48

torpedo; provide for turnaround and repair of a large inventory of torpedoes, fire control systems, missiles and launchers; maintain on-going systems engineering effort, and provide for tests of actual ASW combat system readiness-effectiveness.

One measure of the magnitude and importance of this effort is the range of weapons for which engineering and maintenance is provided. These include the Navy's inventory of torpedoes, surface and submarine torpedo tubes. ASROC and SUBROC missiles and launchers, underwater fire control systems and the systematic test and evaluation of overall ASW combat system readiness.

Surface Missile Systems Rework and Maintenance Project

The Surface Missile Systems rework and maintenance project is budgeted at $54.4 million in 1973, or approximately at the fiscal year 1972 level.

This project provides for the rework of surface missiles and their associated fire control, launchers and test equipment.

Additionally, engineering and supporting services required for the maintenance of an effective overall fleet operational readiness position are funded here. Missile systems supported include the Standard missile, in both medium and extended range versions, and the Tartar, Terrier, and Talos missiles.

Point Defense Missile Weapon System

The Point Defense Missile Weapon System is also supported from this project. Support will also be provided in 1973 for a growing population of ships being equipped with the ship antimissile defense system for use against the threat from air- and surface-launched anti-shipping missiles.

Chairman Ellender. Senator Hollings, you may proceed.

Charleston Shipyard Complex Reductions

Senator Hollings. I wish I had confronting me the changes of personnel in the six districts relative to the district itself. On the U.S. craft mine fleet down there, I want to hear from you what we are doing. As long as there are formal cuts in the best interest of the Navy, I am for them, but I wonder, from that standpoint, do you have those facts at hand? Are you familiar with those?

Admiral Minter. I know in a general way, Senator Hollings. You may be referring also to reductions in the shipyard and that sort of thing, but the decommissioning of the minecraft is an on-going program. The MSO's—many of those are being transferred to the Reserve forces, but others are being decommissioned or scrapped. I am not sure I am going to be responsive in enough detail to satisfy you, sir, but I can provide it for you if you can tell me other areas that you are concerned about.

Senator Hollings. Now you are using helicopters.

Admiral Minter. We do have minesweeping helicopters which will replace these older ships that will not be required for active fleet use as minesweepers.

Senator HOLLINGS. But the cut in personnel within the yard. Do you know what that was?

Admiral MINTER. Yes. We had to take a very substantial cut across the entire 10 Navy shipyards that we control, in an effort to try to scale down our total yard force.

Senator HOLLINGS. So it was consonant with all the yards, with the general policy, and not with this particular yard?

Admiral MINTER. Yes.

Admiral SONENSHEIN. The naval shipyard complex is being reduced this year; a national reduction in fleet units. The number of people at the end of fiscal year 1971 at 10 naval shipyards was 72,426. At the end of this fiscal year, 1972, it will be reduced to 67,062, a reduction of 5,364. Now if one were to take an average of the naval shipyards, that would be 536 per yard.

CHARLESTON NAVAL SHIPYARD

In the case of Charleston, the reduction that is being made there is in the order of 309, so I would say that the reduction there is less than the average nationally.

Senator HOLLINGS. The whole point being, I am for beefing up the Navy. The President submits an increased budget, and he says it is to be mostly in the submarine field, and this is a submarine installation. We have the Polaris and I did not see how we could beef up and ask for money.

Admiral SONENSHEIN. The reduction is 309 of which 266 will be by reduction in force. In addition 28 temporary employees will be released and the balance by attrition. I would say also the Charleston Naval Shipyard is what we call a hard-core yard, and as you alluded already, it is concerned primarily with the overhaul work for nuclear-powered submarines, both ballistic and attack.

So while this reduction is commensurate with the overhaul reductions in all the naval shipyards, although somewhat less, I foresee a very firm future.

Captain BROCK. The budget change in fiscal 1972 and 1973 is a cumulative total, about 7,700 people. That is from last June, on board. But the CNO is vitally interested in the shipyards that are located in naval complexes because of his longstanding policy to overhaul ships within their own port. In areas like Charleston, which is a principal home port on the east coast, we are extremely interested in maintaining as large a work force as possible simply in order to do the scheduled work connected with the ships in that yard.

Senator HOLLINGS. Thank you, Mr. Chairman. I can get the specifics concerning this from the admiral. I wanted to make sure that I did not go in two different directions at the same time.

Admiral MINTER. We appreciate your concern.

FIELD OPERATIONS

The fourth ordnance project is field operations. Our request of $30.5 million in 1973 will provide for support of the Naval Ordnance Systems Command, its fleet support offices on both coasts and inspection and contract administration functions. This project reflects a reduction

of $0.6 million in 1973 in line with generally lower supporting manpower levels.

SUBCOMMITTEE RECESS

Chairman ELLENDER. Admiral, will it be convenient for you to return at 2:15?

Admiral MINTER. Yes, sir.

Chairman ELLENDER. We will reconvene at 2:15 p.m. We stand in recess until 2:15 this afternoon.

(Whereupon, at 12:30 p.m. the subcommittee was recessed, to reconvene at 2:15 p.m. on the same day.)

(Afternoon Session 2 o'Clock, Wednesday, March 1, 1972)

DEPARTMENT OF DEFENSE

Operation and Maintenance, Navy

STATEMENT OF VICE ADMIRAL C. S. MINTER, JR., U.S.N., DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS) Resumed

SHIP SYSTEMS TECHNICAL SUPPORT

Chairman Ellender. The subcommittee will come to order.

Admiral, I believe you were in the middle of page 21, Ship Technical Support.

Admiral Minter. The request of $315.8 million for ship systems technical support will fund ship engineering, technical, repair, and logistics service projects in support of the active and inactive fleets. Included are the repair of electronic, hull, machinery and electrical equipment; support of salvage operations; the Supervisors of Shipbuildings; the Naval Ship Engineering Center; other fleet industrial support facilities; and technical training and hardware support of training operations. Other significant programs include planning and engineering for complex ship overhauls, ship designs, and engineering services to the fleet, and industrial readiness. The request for ship technical support programs is $18.3 million below fiscal year 1972. This decrease generally reflects the net effect of a $17.3 million reduction for the Naval Ship Engineering Center resulting from a planned change in the accounting system which shifts budgeting for work to be performed to customer programs; force related reductions of $13.2 million in other technical and engineering programs; and a partially offsetting increase of $12.2 million. This latter increase provides for the installation of equipment in a land-based reactor training plant at West Milton, N.Y. The additional unit is required to train military personnel for manning the increasing number of nuclear ships. In order to reduce costs for this necessary capability we are making maximum use of existing equipment available from deactivated ships, which is being refurbished.

The fiscal year 1973 request for remaining programs totals $232.9 million. This request consists of $82.3 million for electronic systems technical support. This provides for installation of electronic equipment at air stations and training centers and major repair of electronic

shore and shipboard equipments and components. For facilities technical support, providing for management of real estate and facilities of the Department of the Navy, including the operation of three construction battalion centers, $108.9 million is requested. Also $41.7 million is requested for material command and support, providing for the Headquarters of the Chief of Naval Material and field support projects.

The $232.9 million request for the foregoing programs includes the transfer of $28.2 million from other accounts mentioned earlier. One of these is for $21 million transferred from Budget Activity 9 which reimburses the Department of Labor for injury and death benefits payments made by that agency to Navy employees and dependents. The other is $7.2 million transferred from the Research and Development appropriation for operation of the Naval Training Devices Center, Orlando, Fla.

SHORE POLLUTION ABATEMENT PROGRAM

Exclusive of these two transfers, the $232.9 million includes a net increase of $2.5 million over fiscal year 1972. This increase is associated with the management and execution of the Navy's shore pollution abatement program. The fiscal year 1973 estimate for pollution abatement in the facilities technical support program is $10.9 million, consisting of repair and minor construction projects to reduce air and water pollution at naval shore installations.

Chairman ELLENDER. How much of that do you have to do? Is that solely abroad ships?

Admiral MINTER. No, sir; the program is spread through a number of the appropriations. There is about $139 million total in the Navy's environmental protection program this year for shore installations, for ship installations, for a variety of things. I have a breakdown but for this particular appropriation we are speaking of which includes $10.9 million in the facilities technical support program, $1.9 million in the ships technical support program for a total of $12.8 million.

Senator YOUNG. Could we have the figures put in the record?

Chairman ELLENDER. Yes, sir.

Admiral MINTER. For all appropriations?

Chairman ELLENDER. Yes, sir. What is it costing the Navy to fight pollution?

Admiral MINTER. As I said, $139 million is listed total in this year's Navy request in all appropriations.

Chairman ELLENDER. How do you use that money? If a facility of yours is adjacent to a city, do you contribute to the city's work?

SATELLITING ON A CITY

Admiral MINTER. It can go either way. If we are satelliting on a major city and we are able to use their processing facilities, we will pay them for sewer services. But the reverse situation applies occasionally where we might be the major activity and a city next door would use our facilities. Then they would pay us.

Chairman ELLENDER. The costs are divided?

Admiral MINTER. Yes, sir.

Chairman ELLENDER. The same arrangement applies to maintenance?

Admiral MINTER. Yes, sir.

Chairman ELLENDER. Proceed.

Admiral MINTER. I have Commander D'Emidio, who is head of our pollution program in the Navy, if you would like to talk to him further.

Chairman ELLENDER. You might put the program in the record.

Admiral MINTER. Yes, sir.

(The information follows:)

FUNDS REQUESTED IN FISCAL YEAR 1973 FOR THE NAVY ENVIRONMENTAL PROTECTION PROGRAM

Appropriation	Category	Amount (millions)
O. & M., Navy	Air	$2.1
Do	Water	10.7
O. & M., Marine Corps	do	.1
Milcon	Air	24.8
Milcon	Water	56.3
OPN	Air	.1
OPN	Water	24.8
PAMN	Air	6.9
PAMN	Water	2.8
R.D.T. & E	Air/water	10.7
Total		139.3

CENTRAL SUPPLY AND MAINTENANCE

AIR SYSTEMS TECHNICAL SUPPORT

Chairman ELLENDER. With respect to the request for Budget Activity 7, Central Supply and Maintenance, which is for a total of $1,859.6 million, we will start with the $728.7 million request for Air Systems Technical Support. Before getting into the 1973 request, however, I think a comprehensive explanation of the difference between the original 1972 request for this support and the revised estimate as provided in the 1973 justification book is necessary. The difference in the case of air systems support is $45 million, consisting essentially of a decrease in the estimate for aircraft rework and maintenance of $60.5 million, offset by increases of $6.1 and $3.9 million in field operations and supporting programs. Would you please provide an explanation for the record as to why these 1972 estimates are as far off as they are?

Admiral FEIGHTNER. There have been some adjustments in this program since we presented it to you last year. As you may recall, last year in our discussions on the effects of inflation, we indicated some of the problems we thought we would be faced with in execution. During the course of the year, in order to absorb some of this type of inflationary costs, it was necessary to reprogram money into other areas. In the aircraft rework and maintenance program the overall impact has been an approximate reduction of $60 million and 270 planned aircraft reworks. About $40 million of this has been reprogramed into other budget activities and $20 million to other programs within the budget activity.

Perhaps the best way to present the changes in the aircraft rework, field operations and supporting programs are in tabular form. I would like to insert a listing of the changes that have occurred in these programs.

(The information follows:)

	Millions
AIRCRAFT REWORKS	
Original fiscal year 1972 submit	$558.9
Graded pay increase (January 1971)	+5.0
Graded pay increase (January 1972)	+1.7
Ungraded pay increase	+5.0
Foreign currency revaluation	+.8
Congressional reduction	−7.3
Reprograming	−59.9
Subtotal	−54.7
Fiscal year 1972 estimate in fiscal year 1973 submit	504.2
FIELD OPERATIONS	
Original fiscal year 1972 submit	82.1
Graded pay raise (January 1971)	+5.0
Graded pay raise (January 1972)	+2.2
Increased health benefits	+.4
Reprograming	+3.4
Congressional reduction	−.5
Transfer of NPC, Wash to prog. 9	−4.4
Subtotal	+6.1
Fiscal year 1972 estimate in fiscal year 1973 submit	88.2
SUPPORTING PROGRAMS	
Original fiscal year 1972 submit	146.5
Graded pay increase (January 1971)	+.3
Graded pay increase (January 1972)	+1.2
Congressional reduction	−4.5
Reprograming	+6.9
Subtotal	+3.9
Fiscal year 1972 estimate in fiscal year 1973 submit	150.4

Current Rework and Maintenance

Chairman Ellender. In the 1973 request a further decrease is estimated in the aircraft rework and maintenance program for fiscal year 1973 of $5.8 million. Page 1–7–4 of the justification provides a reasonably succinct breakdown of the major components of this request so I will insert it for the record at this point.

(The information follows:)

[Dollar amounts in millions]

	Fiscal year 1971		Fiscal year 1972		Fiscal year 1973	
	Units	Costs	Units	Costs	Units	Costs
Aircraft	2,210	$201.2	2,337	$202.1	2,241	$198.3
Engines	7,280	98.4	7,094	93.7	6,856	91.6
Components		182.2		198.1		190.4
Supporting programs		63.5		72.1		69.8
Total gross program		545.3		566.0		550.1
Budget activity 5: Reserve Forces		−33.9		−34.0		−31.7
Reimbursement from research, development, test, and evaluation, Navy		−18.0		−18.7		−18.7
Reimbursement from other sources		−.1		−9.1		−1.3
Total budget activity 7		493.3		504.2		498.4

Senator YOUNG. Would you please indicate to the committee where the facilities are that are presently performing the rework and maintenance needs for aircraft and would you also please tell us what the impact of the forecast reduction will have on these facilities and their manning?

Admiral FEIGHTNER. It should be noted that a portion of the aircraft rework and maintenance effort is performed by commercial contractors and the Army and Air Force. However, I'll be happy to provide a list of the naval air rework facilities performing aircraft depot maintenance, as well as the civilian personnel estimates for each facility. These figures reflect the budgeted reductions.

(The information follows:)

[End fiscal year on board]

	1971	1972	1973
Alameda, Calif	6,380	5,931	5,579
Cherry Point, N.C	2,200	2,210	2,360
Jacksonville, Fla	2,932	2,761	2,690
Norfolk, Va	5,135	4,816	4,623
North Island, Calif	6,710	6,435	6,282
Pensacola, Fla	4,253	3,981	3,651
Quonset Point, R. I	2,741	2,640	2,482
Total	30,351	28,774	27,667

COMPONENT REPAIR AND SUPPORTING PROGRAM

Chairman ELLENDER. I would like you to break down the figures you have provided for components and supporting programs into the major categories that you have listed on the bottom of page 1–7–4. Your shipment expenses, emergency repairs, and technical services to the fleet are of special interest and I wish you would explain these areas in particular. I am curious as to how much is for the emergency repairs and technical services and why they need to be included in this budget activity. Would you please provide the committee with this information?

Admiral FEIGHTNER. I will be glad to provide you a breakdown of the component repair and supporting program.

(The information follows:)

	Fiscal year 1973 (millions)
Component rework: Repair, check, and test of aviation equipment and devices which are not integral parts of, or identified as, airframes or engines	$190.4
Modifications: Work done at the Naval air rework facilities as required by technical directives to incorporate minor changes and correct discrepancies	1.1
Emergency repair: Repairs required to restore an aircraft to ready and safe use. This category does not include aircraft scheduled for standard rework	10.1
Preservation: Special work done to protect and preserve aircraft, engines, and components during period of idleness or storage prior to induction into rework or shipment	4.6
Salvage: Removal of installed equipment from stricken aircraft, screening and disposition of saved equipment	2.0
Acceptance and transfer: Correction of discrepancies found during test flight after rework has been accomplished and before aircraft is accepted by the fleet	4.1

	Fiscal year 1973 (millions)
Technical fleet support: Includes several subprograms such as analytical rework, pool/line maintenance, shipboard work, repair of fleet test equipment, and other miscellaneous projects	$37.6
Rework of electronic aeronautical parts: Repair of special traveling wave tubes peculiar to aviation equipment	1.4
CAMSI: Provides for the carrier aircraft maintenance support improvement project which is responsible for developing, coordinating, and and integrating improvements in shipboard support of carrier aircraft	3.5
Classified pay raise: Funds for the January 1972 civilian personnel pay raise	3.4
MSDO: The Management Systems Development Office is responsible for coordinating, implementing, and maintaining uniform information systems for designated aviation field activities	2.0
Total component and supporting programs: It is appropriate to include emergency repairs and technical services in the aircraft rework and maintenance budget because these services are provided by the same Naval air rework facilities performing aircraft depot maintenance. In addition, there is a correlation between engineering services and the analysis of both rework cycles and rework depth	260.2

Field Operations

Chairman Ellender. On page 1–7–5 of the justification, where you deal with the field operations program I notice that you are requesting a reduction of some $2.4 million, all of which will be absorbed by the field activities subactivity. On page 1–7–6, however, you indicate that there is a reduction of 205 personnel calculated into the command and administration subactivity of this program. Despite the reduction in personnel, the command and administration request is actually slightly higher than in 1972. Would you please indicate specifically how much is saved by the reduction of the 205 personnel and what purposes are those funds allocated to in 1973?

Admiral Feightner. The end strength for full-time employment in command and administration decreased from 2,078 in fiscal year 1971 to 1,873 in fiscal year 1972, and remains at the 1,873 level in fiscal year 1973. There was a $2.9 million savings from the loss of 205 personnel during fiscal year 1972. However, this decrease was mostly offset by the costs of classified pay raises. The slight increase of $0.1 million in 1973 is due to increased costs in the area of communications and printing and reproduction.

Naval Air Systems Command Headquarters

Chairman Ellender. You indicate on page 1–7–6 that the command and administration portion of the request is for the Naval Air Systems Command Headquarters. Would you please tell the committee how many military personnel are included in that headquarters staffing and explain why such a large staff is necessary at the headquarters level?

Admiral Feightner. The fiscal year 1973 Department of the Navy justification of estimates submitted to Congress January 1972, projected a military end strength of 346 officers in Naval Air Systems Command Headquarters. Since that time, additional reductions have been identified and fiscal year 1973 revised end strength is 321. These military positions are established in the Naval Air Systems Command

Headquarters at key points to provide the vital element of combat/fleet experience into the managerial functions of design, development, research and procurement, and logistics support of naval aircraft and supporting equipment.

Personnel in Field Activities

Senator Young. How many personnel, both military and civilian, are included in the Field Activities portion of the request for Field Operations? What is the cost of the civilian personnel salaries and benefits?

Admiral Feightner. The Field Activities portion of the request for Field Operations will require 463 military and 2,664 civilian personnel in fiscal year 1973. The civilian personnel salaries and benefits are budgeted at $41.5 million.

Chairman Ellender. Please furnish for the record a breakdown showing the name and location of the 17 individual field activities, the number of personnel staffing these facilities, broken down into civilian and military, the cost of the civilian personnel assigned, and the basic mission or primary function of each activity.

Admiral Feightner. Yes, sir.

(The information follows:)

Activity name and location	Number of military personnel	Number of civilian personnel	Civilian personnel costs (millions)
Naval Air Systems Command representative offices:			
San Diego, Calif	70	204	$3.3
Norfolk, Va	16	268	4.4
Inspection and contract administration offices:			
Baltimore, Md	7	95	1.5
Bethpage, N.Y	18	194	3.1
Columbus, Ohio	5	56	.9
Dothan, Ala	4	29	.4
Hartford, Conn	7	192	2.9
Stratford, Conn	5	65	1.0
Burbank, Calif	19	92	1.5
Dallas, Tex	10	136	1.9
Long Beach, Calif	6	70	1.1
Naval Aviation Integrated Logistics Support Center, Patuxent River, Md	92	115	1.7
Naval Aviation Engineering, service unit, Philadelphia, Pa	110	595	9.6
Naval Air Technical Service Facility, Philadelphia, Pa	6	294	3.7
Naval Weapons Systems Analysis Office, Quantico, Va	3	20	.4
Naval Weapons Engineering Support Activity, Washington, D.C	84	222	3.8
Naval Material Industrial Resources Office, Philadelphia, Pa	1	17	.3
Total	463	2,664	41.5

The basic mission or primary function of each activity follows:

The two Naval Air Systems Command Representative Offices represent the Command in the exercise of technical coordination, administrative control, and liaison in matters of fleet readiness and training. Specifically they analyze and determine maintenance requirements for aircraft, engines, components, air-launched missiles and support equipment. They also conduct personnel programs covering wage and classification, training, employment and employee services and relations. In addition, these offices provide logistic, maintenance, and technical guidance on weapons systems to the Training and Fleet Commands.

The nine Inspection and Contract Administration Offices provide contract administration services identified in the Armed Services Procurement Regulation 1–406, as may be modified by Armed Services Procurement Regulation 20–703.3, including contract administration officer authority on assigned contracts. They also provide representation with the assigned contractor concerning procurement of materials and services for all Department of Defense departments and agencies, and other government agencies and foreign governments as required.

The Naval Aviation Integrated Logistics Support Center provides assistance to the Naval Air Systems Command in effectively providing timely and inte-

grated logistic support to the fleet for Naval aviation systems and equipment by development and application of advanced integrated logistics support procedures and techniques, determination of support system contract requirements for specific aviation weapon systems and equipment programs and evaluation of contractor performance in meeting support system contract requirements.

The Naval Aviation Engineering Service Unit provides field engineering assistance and instruction to Naval aviation activities in the installation, maintenance, repair and operation of all types of aviation systems and equipment.

The Naval Air Technical Services Facility provides technical services in connection with the development, preparation and indexing of publications and the distribution of aeronautical technical data required to operate and maintain aviation systems and equipment by fleet personnel.

The Naval Weapons Systems Analysis Office provides the Navy with comparative cost analyses on weapons and weapons support systems by use of simulation models. Data derived from these models aid the Navy in determining required personnel and material resources for support of aircraft on a Navy wide basis as well as support required for an individual squadron of airplanes. Model simulation provides immediate information for the management of aviation resources as well as long-range planning data essential for development of future aviation plans.

The Naval Weapons Engineering Support Activity provides the Naval Air Systems Command with engineering support required to resolve specific weapon systems problems in the areas of reliability and maintainability and services associated with the development, evaluation, test and procurement/production of all aviation ground support equipment.

The Naval Material Industrial Resources Office coordinates, on a Navy-wide basis, procedures for industrial production equipment including both the mobilization capacity and equipment redistribution programs which are under direction of the Secretary of Defense.

Field Activities Facilities

Chairman Ellender. Does the request for field activities represent an increase or decrease in the number of actual field activity facilities since last year? If there is any change, please indicate which activities were involved and why.

Admiral Feightner. Last year we budgeted for 20 field activities. The fiscal year 1973 estimate contains only 17 field activities or a decrease of 3 facilities. The inspection and contract administration office at St. Louis, Mo. has been transferred to the Air Force and the Office at Philadelphia, Pa. has been transferred to the Army. The Navy Photographic Center, Washington, D.C. has been included in budget activity 9 for 1973 along with a comparable 1972 estimate.

Chairman Ellender. I notice on page 1-7-6 that there is a $2.5-million decrease in the field activities. Would you please tell the committee exactly what reductions make up the total $2.5-million reduction?

Admiral Feightner. I'll be glad to insert a table showing the fiscal years 1972 and 1973 estimates and the differences for each field activity.

(The information follows:)

[In millions of dollars]

Activity	Fiscal year 1972	Fiscal year 1973	Difference
Inspection and contract administration offices	18.2	14.7	−3.5
Naval Air Systems Command representative offices	9.3	8.9	−.4
Naval Weapons Engineering Support Activity	4.7	4.1	−.6
Naval Weapons Systems Analysis Office	.4	.4	
Naval Material Industrial Resources Office	.4	.4	
Naval Aviation Integrated Logistics Support Center	2.0	2.1	+.1
Naval aviation engineering service unit	8.5	10.5	+2.0
Naval air technical services facility	4.2	4.1	−.1
Total	47.7	45.2	−2.5

Supporting Programs

Chairman Ellender. I noticed on page 1–7–6 that you are requesting a decrease of $21 million for supporting programs, which consist of repair of catapults and arresting gear, second destination transportation and logistics, maintenance and engineering support. The reduction is reflected in all three of these categories as indicated below.

(The information follows:)

[In thousands of dollars]

	Fisca year—		
	1971	1972	1973
Catapults and arresting gear	23,827	27,850	19,882
2d destination transportation	48,879	44,300	36,810
Logistics, maintenance and engineering support	81,237	78,272	72,738
Total	153,943	150,422	129,430

Airfield Lighting and Landing Aids

Senator Young. With regard to the catapults and arresting gear, I see that repair of airfield lighting and other shore-based landing aids is included in this request. Would you please explain to the committee why these items are not included in the General Purpose Forces budget activity?

Admiral Feightner. The cost of the day-to-day maintenance of shore-based landing aids is funded and supported under General Purposes Forces, budget activity 2. However, it has been determined to be more economical to support the installation, major repair and modernization of these systems under a centrally managed program. This centralized program provides a uniform and coordinated method of insuring up-to-date and efficient landing aid systems which are essential to meet the safety criteria for the aeronautical shore establishment.

Aircraft Launching Systems Overhaul

Senator Young. Also included in the activities funded by this program is the "modification, maintenance and cyclical overhaul of aircraft launching and recovery systems aboard aircraft carriers." Would you tell the committee how many of these overhauls are planned for fiscal year 1973 as compared to 1972 and how much of the total request is for this purpose?

Admiral Feightner. In fiscal year 1972 there were three carrier overhauls scheduled. In fiscal year 1973 there is one regular carrier overhaul scheduled. However, there are three selected restricted availabilities which are being extended to approximately 6 months. The scope of the alterations planned for catapults and arresting gear on those three carriers approaches of that of a regular overhaul. The fiscal year 1973 request of $19.9 million under the category of Catapults and Arresting Gear and includes $8.9 million for overhaul and repair effort.

Second Destination Costs

Chairman Ellender. With regard to the second destination item, would you please consolidate all of the second destination items in the various activities and programs into one table so that we can address the total second destination request in context. Also, in preparing such a table, please include the comparable 1972 figures.

Admiral Minter. I will provide that for the record, sir.

(The information follows:)

[In thousands of dollars]

Carrier	Fiscal year— 1972	1973
Military Airlift Command	32,325	34,993
Special Aircraft Assignment	3,462	3,765
Cargo	27,926	30,191
Overseas mail	937	1,037
Military Sealift Command	65,815	50,289
Cargo	64,320	48,851
Overseas mail	1,495	1,438
All other	65,120	60,765
Commercia loverseas mail	15,516	15,206
Cargo	49,604	45,559
Total destination transportation	163,260	146,04

Senator Young. How much of the total reduction in the second destination costs is directly related to the reduction in Navy activity in the Vietnam conflict?

Admiral Minter. Approximately $5 million of the reduction is directly related to reduced Navy activity in Vietnam.

Miscellaneous Increases

Chairman Ellender. Aside from the reductions due the Vietnam slowdown in naval activity, are there any increases elsewhere that offset these reductions to any degree? If there are would you please specify what the items of increase are and why the increase is needed?

Admiral Minter. Yes, sir. Approved tariff rate increases at industrial funded transportation activities will increase fiscal year 1973 costs by approximately $5 million. Two of the rate increases, a 25.8 percent increase for cargo airlift and a 34.4 percent increase for special assignment aircraft, took effect on January 1, 1972, and will cost approximately $4.4 million. Also, effective July 1, 1972, there will be a 5.5 percent port handling rate increase costing $0.6 million.

Logistics, Maintenance and Engineering Support

Chairman Ellender. In regard to the $72.7 million request for logistics, maintenance and engineering support, would you please provide the committee with a more detailed breakdown of the total 1973 request showing the comparable 1972 funding for each program? In

addition, after each program, please indicate the scope of the program and why the funding request is as high as it is.

Admiral FEIGHTNER. I'll be glad to provide that information.

(The information follows:)

There are 32 individual programs in the area of Logistics, Maintenance and Engineering Support which is budgeted at $78.3 million in fiscal year 1972 and $72.7 million in 1973, a decrease of $5.8 million.

The funding level is required because each of these programs represents a unique support capability for in-use fleet weapon equipment. A two year comparison of the major categories of effort along with a brief description of each is provided below.

(a) Engineering for in-service weapon-systems (million):	
Fiscal year 1972	$14.5
Fiscal year 1973	13.8
Change	—.7

This category is a summary of all analytical engineering investigation of design deficiencies and material and maintenance failures in fleet held aviation weapon systems. Following the investigations, corrective actions are implemented to prevent problem recurrence. All in-use aircraft systems and related equipment fall within the scope of this program as well as air-launched weapons, targets, launch and retrieval systems and Anti-Submarine Warfare equipment.

(b) Test equipment (millions):	
Fiscal year 1972	$21.2
Fiscal year 1973	19.7
Change	—1.5

This effort provides for the maintenance, calibration, configuration control and engineering support of aviation test equipment. This includes automatic test equipment such as the Semi-Automatic Checkout Equipment (SACE), Versatile Avionics Shop Test (VAST) and other precision measurement equipment.

(c) Other ground support equipment (millions):	
Fiscal year 1972	$6.9
Fiscal year 1973	6.8
Change	—.1

The maintenance and engineering required on generators, gas turbine equipment, oxygen and nitrogen carts and trailers, loading, lighting and other aircraft handling and servicing equipment are funded within this program.

(d) Technical publications, millions):	
Fiscal year 1972	$5.5
Fiscal year 1973	4.7
Change	—.8

This item finances the preparation, printing and distribution of technical publications, directives, allowance lists and technical drawings issued for out-of-production weapon systems.

(e) Range support (millions):	
Fiscal year 1972	$7.4
Fiscal year 1973	7.1
Change	—.3

Under the category of Range Support are the functions of technical and logistics support of the Barking Sands Tactical Underwater Range in Hawaii, which provides the capability of evaluating Fleet Anti-Submarine Warfare performance. In addition, funds provide for developing and evaluating aircraft tactical doctrine.

(f) Quality evaluation (millions):	
Fiscal year 1972	$5.5
Fiscal year 1973	4.5
Change	—1.0

The quality evaluation function is to monitor the reliability of air-launched missile systems to ensure the highest possible state of readiness.

(*g*) Standardization (millions):	
Fiscal year 1972	$2.4
Fiscal year 1973	1.8
Change	—.6

This is an economy program under the scope of Public Law (Section 2451–2456, Title 10, U.S. Code). The goal is to produce uniformity among the Services for such things as specifications, standards, qualified products lists and indexes.

(*h*) Contract engineering technical services (millions):	
Fiscal year 1972	$2.6
Fiscal year 1973	2.5
Change	—.1

Contractor personnel are reimbursed for technical advice, liaison and training given fleet personnel on aviation systems.

The balance of Logistics, Maintenance and Engineering Support consists of programs such as the support of meteorological equipment, industrial preparedness measures, the installation of equipment in fleet intermediate-level maintenance shops, minor construction projects, structural tests to determine the optimum life of weapon systems and the maintenance of Coast Guard electronics equipment.

Ordnance Systems Technical Support

Chairman Ellender. We will move now to the request for Ordnance Systems Technical Support for $227 million, which appears on page 1–7–8 of the justification. This request is $12.9 million below the revised 1972 estimate. The largest part of this reduction is in the ordnance rework, maintenance and support area where $6.4 million is reduced leaving a request for $109.4 million for 1973. You indicate on page 1–7–9 that the reduction is due "mainly to force level reductions and tempo adjustments." Would you elaborate on that statement a bit please? Of the total number of personnel employed in these functions, how many have been reduced and from which facilities and so forth?

Admiral Christman. Force level reductions and tempo adjustments relate to military operations which in turn result in personnel decreases. The number of personnel reduced and effected facilities will be provided for the record.

(The information follows:)

The reduction of $6.4 million will result in the following personnel decreases:

Item	Activity	Personne decreas
Guns, launchers, and fire control	Naval Ammunition Depot, Crane, Ind	3
	Naval Ordnance Station, Louisville, Ky	7
Mine rework and components	Naval Weapons Station and Mine Engineering Facility, Yorktown, Va.	10
Ammunition	Various naval ammunition depots and weapons stations (workload distribution not firm at this date).	(1)
Special equipment	Not available	0
Other ordnance material	(2)	(2)

[1] Maximum of 10 personnel.

[2] This category includes a multitude of unrelated items such as gun, torpedo, gunfire control system, and radar repairs. These items are coordinated by the Spare Parts Control Center (SPCC), Mechanicsburg, Pa., and the Electronics Supply Office (ESO), Great Lakes, Ill. These inventory control points submit work requests to various Department of Defense activities and private contractors.

All of the above activities, with the exception of SPCC Mechanicsburg and ESO Great Lakes, are Naval Ordnance Systems Command industrial fund activities.

TEMPO ADJUSTMENTS

Senator YOUNG. What sort of "tempo adjustments" have been made in the carrying out of this rework and maintenance and why? It seems to me that normally you would want to maintain the same tempo but reduce the force level further. Would you please tell us why you plan to go the route of reducing the tempo?

Admiral CHRISTMAN. "Tempo" as used in the budget justification relates to the reduction of activity in military operations, such as sortie rates, and not to the rate of performing rework and maintenance. As the tempo decreases, force levels decrease, steaming hours are reduced, older ships are deactivated, and personnel levels performing rework and maintenance functions are reduced accordingly.

SUPPORT PROGRAM REDUCTION

Senator YOUNG. You also indicate that $2.4 million is being cut from the support programs in fiscal year 1973 operating forces. What is the precise savings resulting from reduced operating forces and precisely how does this affect the cost of the support programs operations?

Admiral CHRISTMAN. Savings, resulting from reduced operating forces, amount to $1.1 million in fiscal year 1972 and $3.5 million in fiscal year 1973. Reduced operating forces do not directly affect the cost of the support program operations. Support programs such as ammunition receipt, segregation, stowage and issue will incur increased costs due to increased off-loadings, segregation and stowage while other maintenance and logistics support programs will decrease in fiscal year 1973 by $2.8 million.

Chairman ELLENDER. Are there any increases to the support programs that are not shown in the justification that offset the reduction due to the reduction in operating forces? If there are, would you please indicate what they are and exactly what the funds will be used for?

Admiral CHRISTMAN. The only increases relate to Civilian and Wage Board pay raises.

FIELD OPERATIONS OF ORDNANCE SYSTEMS

Chairman ELLENDER. The request for field operations in the ordnance systems technical support program is essentially the same as that of last year. On page 1–7–9, you indicate that the nonindustrial field establishment includes two offices, one at Norfolk, Va., and one at San Diego, Calif., and that these two are the primary points of contact for the fleet for ordnance problems et cetera. That portion of the request for this particular activity is being reduced by about $1 million from $10.3 million in 1972 and I was wondering why more couldn't be reduced in this coming year? It seems that naval activity in ordnance will be falling off this coming year even more than last year and I can't see why nearly the same amount should be appropriated for this purpose. Would you please explain this to the committee?

Admiral CHRISTMAN. The $9.2 million requested in fiscal year 1973 for the Ordnance Field Establishment will provide funding support for both the Naval Ordnance Systems Support Offices and for the

Naval Plant Representative Offices. The functions of the Naval Ordnance Systems Support Offices are to act as direct representatives of the Commander, Naval Ordnance Systems Command and are charged with the mission responsibility to be the primary point of contact with the fleet for resolution of ordnance problems affecting fleet readiness.

The function of the Naval Plant Representative Offices is to provide contract administration services for any Government procuring agency or any production and/or R. & D. item for which contractual cognizance has been assigned and, therefore, is not directly related to fleet requirements.

It is felt that the $1.1 million reduction from fiscal year 1972 to fiscal year 1973, approximately 11 percent, is consistent with the fleet reduction. Force levels are being reduced. However, those ships being removed from the active fleet have older weapons systems/equipment which are unencumbered and required only minimal support. Within the funds requested, the Naval Ordnance Systems Support Offices will be assuming additional workload to support new systems/equipments which are being introduced into the fleet for which fleet personnel do not have the technical capability to fully maintain. Examples of the systems/equipment are: Gunfire control systems MK 86 and MK 87, CHAFFROC, 5-inch/54 gun mount MK 42 model 10, 5-inch/54 gun mount MK 45 model 0, interim surface-to-surface missile system, torpedo MK 48 and the conversion of analog computers to digital computers.

A reduction in fiscal year 1973 funding, below the $9.2 million level, will restrict Naval Ordnance Systems Support Office services to the fleet and seriously jeopardize fleet readiness.

Command and Administration Field Operations

Chairman Ellender. The amount requested for Command and Administration field operations is being increased by some $500,000. In light of what I just asked you to explain regarding lower operations, would you please explain exactly what this increase is for.

Admiral Christman. The 5.5 percent graded employee's pay raise went into effect during the first full pay period after January 1, 1972. Pay raise funds were thus budgeted for less than one-half year in fiscal year 1972. Pay raise funds budgeted for fiscal year 1973 reflect the first full-year's effect of the pay raise, which accounts for the increase of $500,000. There is no personnel increase between fiscal year 1972 and fiscal year 1973. Thus there is no contradiction between the dollar increase in Command and Administration and statements on lower operations which refer to workload and employment at industrially funded activities that are subject to considerable workload fluctuations.

Antisubmarine Systems Rework

Chairman Ellender. With regard to the antisubmarine warfare systems rework and maintenance request for $32.8 million, which you deal with on page 1–7–10 of the justification, would you please furnish for the record a brief explanation of the purpose of each of the five elements shown in the table on page 1–7–10?

Admiral Christman. Yes, sir; I shall be happy to do so.

The fiscal year 1973 torpedo program provides intermediate and depot-level repair support for operational torpedoes, torpedo tubes, targets, and all related components, including associated in-service maintenance engineering. In addition, the program also provides the required material/supplies necessary for initial outfitting of repair facilities to establish an intermediate repair capability for the MK 48 torpedo and torpedo target MK 27.

The underwater fire control program provides maintenance and engineering support for all underwater battery fire control systems (UBFCS), including equipment/component rework for FCS MK 101, 102, 105, 106, and repair of repairable electronic modules for FCS MK 111, 112, 113, and 114.

The ASROC/SUBROC program provides maintenance support for the ASROC missile less payload, associated launcher group MK 16, and all related components; SUBROC effort is for the maintenance, repair, test, inventory control, stowage, and distribution of fleet returned repairable components of the SUBROC missile, as well as the assembly, checkout, and issue of missiles stored as piece parts at depots. Missiles thus stored are monitored while in storage and periodically cycled through service test equipment to test the state of readiness and availability. Also, each missile offloaded from a submarine is recycled through the equipment prior to return to storage, and defective components returned for rework and repair.

The other ASW support programs cover weapon systems ship trials to test and checkout the ASW combat system following ship overhauls, including weapons firing on a range and the ASW systems engineering program that provides for submarine and surface systems, ASW weapons systems effectiveness studies, system documentation for in-service ships that do not now possess it, maintenance and upgrading of existing documentation, coordination drawings, alteration status reports, one-function drawings, and other support required for overall system configuration management.

The ASW underwater ordnance fleet support program provides for ongoing fleet problem investigationn and resolution, identification and correction of design deficiencies, preparation of technical instructions to insure effective incorporation of required system changes, dedicated to support of ASW ordnance equipments in use by the fleet. Involved are such items as: design efforts in support of fire control systems for improved weapon system reliability, adapting the ASROC missile for use with the Navy's new standard missile launcher, and providing improved [deleted] for the MK 46 torpedo.

R.D.T. & E. Torpedo Maintenance

Chairman Ellender. I know that there are R. & D. projects in the torpedo field; do you provide any of the maintenance for these torpedoes? Do you provide any maintenance assistance for any of these research projects? If you do, I wish you would explain to the committee precisely what your role is in the program.

Admiral Christman. No O. & M.N. funds are provided for maintenance of torpedoes procured in an R. & D. project or for torpedoes used for R. & D. purposes. The R.D.T. & E., N. appropriation is required to support those weapons involved in R. & D. programs.

Surface Missles Rework

Chairman Ellender. Further down on page 1–7–10, I notice that the surface missile systems rework and maintenance request is down $0.8 million from the 1972 request of $5.2 million. I don't imagine that this particular program is affected much by the lower force levels so I don't expect much of a change, but I would like you to explain the decrease due to the rework of missile explosive components and weapon system modules. What is this all about?

Admiral Christman. Rework of missile explosives components and weapon system modules requirements vary from year to year depending on the number of units requiring rework. When the propellant in a missile rocket motor becomes overage, it must be replaced. Also, when launcher and fire control system modules become inoperable, they are removed and shipped to rework activities for repair. In order to remain within the fiscal year 1973 missile systems rework and maintenance funds, Navy elected to reduce the propellant and module rework effort since the rescheduling of this work would have the least impact on the fleet during fiscal year 1973.

Ships Systems Technical Support

Chairman Ellender. Turning now to ships systems technical support in general and ship maintenance logistics in particular, on page 1–7–11, I notice that the 1973 request is $104.5 million, a reduction of $9 million from the 1972 revised estimate. Someplace in the justification I recall having read that the inventory of ships in the regular fleet was 651 as of June 30, 1972, and that you expect it to be 558 at the end of fiscal year 1973. With this in mind, I am a bit surprised that the reduction for ship maintenance logistics is not greater than this. Would you please comment on that? Please be as specific as possible.

Admiral Sonenshein. It would appear reasonable to assume that a decrease in the number of ships would certainly decrease that logistic support provided; however, these particular program requirements are generated more by ships remaining in the fleet than those leaving the fleet.

(*a*) New ships and equipment are being introduced into the Navy each year.

(*b*) These ships are highly complex with sophisticated equipment.

(*c*) Support furnished to older type ships and equipment utilized general engineering talent. The new equipment requires specialized talent at a higher cost.

(*d*) In the past support was furnished for particular equipments; now complete systems have to be supported: that is, radar, sonar, Naval Technical Data Systems (NTDS), and Fire Control Systems.

Ship Acquisition Logistic Support

Chairman Ellender. In the ship acquisition logistic support area, I notice on page 1–7–12 that the request for fiscal year 1973 is $3.6 million below the revised estimate for 1972 and that the reduction is primarily associated with a reduction in civilian personnel at vari-

ous supervisors of shipbuilding offices. Would you please provide the committee with a listing of the supervisors of shipbuilding offices and the 1972 manning and the proposed 1973 manning.

Admiral SONENSHEIN. The listing of the supervisors of shipbuilding offices and the manning for fiscal year 1972 by office will be placed in the record. The manning by office for fiscal year 1973 cannot be determined at this time as it is not known in which areas the new construction contracts will be awarded.

(The information follows:)

Supship	End strength fiscal year 1972	End strength fiscal year 1973
One	48	
Three	100	
Four	15	
Five	196	
Six	48	
Eight	190	
Nine	50	
Ten	19	
Eleven	340	
Twelve	62	
Thirteen	155	
Fourteen	16	
Fifteen	17	
Bath	92	
Quincy	100	
Groton	364	
Newport News	382	
Jacksonville	95	
Pascagoula	319	
San Diego	8	
Supships	2,616	2,365
MMFO (E) [1]	61	61
MMFO (W) [2]	67	67
Total	2,744	2,493

[1] Maintenance management fleet office (east).
[2] Maintenance management fleet office (west).

SUPERVISOR OF SHIPBUILDING

Chairman ELLENDER. I am informed that the original 1972 request for the supervisor of shipbuilding was $40.7 million but in the justification before us you indicate that that estimate has been revised to $42.9 million. That is quite a large increase, and I would like you to explain it for the record if you will please.

Admiral SONENSHEIN. The increase is the result of both classified and nonclassified pay raises enacted since the original request.

Chairman ELLENDER. As I recall, last year you requested funds for additional staffing for the supervisor of shipbuilding "to better manage the shipbuilding, overhaul, and conversion programs." It seems inconsistent that you would request additional funds for staffing one year and then make fairly extensive reductions in personnel the next. Would you please tell the committee the rationale behind these requests?

Admiral SONENSHEIN. The concern for staffing levels in the supervisor of shipbuilding offices has not changed. Their manpower resources are lower than we would like. This problem is not unique to the supervisor of shipbuilding offices—it is shared by all components of this command. The reduction in the supervisor of shipbuilding

offices is the result of our attempts to best distribute our resources to meet all of the tasks at hand and at the same time stay within the resources available to us.

Naval Ship Engineering Center

Senator Young. With regard to the Naval Ship Engineering Center (NAVSEC), this changeover in accounting that reduces the request for this program from $33.2 million in 1972 to $15.9 million in 1973 is not clear. Would you please provide the committee with an estimate for 1973 under the old system so that we can have a basis of comparison? Either that, or convert the 1972 figure to the new basis. If the 1973 request represents an increase over 1972 on a comparable basis, please explain precisely what the increase is for.

Admiral Sonenshein. The 1973 estimate under the old system would show as $31.2 million. This represents a reduction from 1972 of $2 million, reflecting personnel reductions.

Electronic Systems Technical Support

Chairman Ellender. On page 1–7–15, you take up the electronic systems technical support and indicate that $82.2 million is requested for fiscal year 1973. This represents a $5.5 million increase over the revised estimates for fiscal year 1972, which in turn is $7.5 million greater than the original estimate for fiscal year 1972. Before we get into the fiscal year 1973 request and that increase, would you please explain the $7.5 million increase in the fiscal year 1972 estimates?

Captain Kennedy. Yes, sir. The $7.5 million increase in fiscal year 1972 is the result of the 1971 and 1972 pay raises of $5.3 million, reprograming and functional transfers of $3.2 million, increased health benefits of $0.1 million, offset by congressional reductions of $1.1 million.

Chairman Ellender. As is indicated on page 1–7–15, the electronic systems technical support program is divided into engineering and technical support, for which $46.7 million is requested, and field operations for which $35.6 million is requested. The technical support figure represents a decrease of some $1 million, which is the net of a $3.4 million reduction across all programs offset by a $2.4 million increase due to the pay raise and installation projects. I wish you would elaborate on the $1 million decrease and indicate for the committee the various increases and decreases that went into that figure.

Captain Kennedy. The increases are $0.7 million for pay raises and $1.7 million for the installation of electronic equipment at the Naval War College and Worldwide Military Command and Control System (WWMCCS). The decreases include $1.3 million in engineering services, $0.9 million in installation of communications equipment at naval air stations and training centers, and $1.2 million in the major repair and overhaul of electronic equipment.

Field Operations

Chairman Ellender. On page 1–7–16, I see that field operations is getting a big boost this year with an increase of some $6.7 million pri-

marily in the electronics engineering activities. In the narrative of the justification material you indicate that the reason for the increase is in the transfer of the support of the naval training device center from the R.D.T. & E. appropriation to the O. & M. appropriation. Would you please tell the committee why that transfer was made and why it was made at this particular time?

Captain KENNEDY. Yes, sir. A review of the center's operations and functions 2 years ago indicated that a relatively small percentage of the total effort was R.D.T. & E. The major efforts were determined to be procurement, logistic support, and major repair of training devices which are O. & M. functions. After coordination and approval of all parties concerned, the earliest fiscal year in which the transfer could be made and receive congressional approval was in the fiscal year 1973 budget.

NAVAL TRAINING DEVICE CENTER

Senator YOUNG. What is the function of the naval training device center and how does the $7.2 million requested for the facility compare to the amount provided in the fiscal year 1972 budget?

Captain KENNEDY. The function of the center is to contribute to the Navy's operational readiness by improving the effectiveness of naval training through development, test, procurement, logistic support, alteration, and overhaul of training devices. In fiscal year 1972 the center will receive $7.5 million.

FACILITIES TECHNICAL SUPPORT

Chairman ELLENDER. On page 1–7–17 where you deal with the facilities technical support, I see that it is broken down into three major program areas, facilities management and technical engineering; field engineering direction and support; and construction battalion support. Taking them in order, would you please provide the committee with a breakdown of the centrally managed programs in the facilities management and technical engineering area and indicate how much of the total $38.5 million requested is for each? Would you also please compare the funding of these programs to the 1972 appropriation and explain any material increases or decreases?

Admiral MINTER. Yes, sir.

(The information follows:)

	1972	1973
Collateral equipment	$9,434,000	$10,027,000
Maintenance fleet moorings	620,000	603,000
Transportation special projects	700,000	754,000
Mobile utility support equipment	570,000	478,000
Maintenance service craft	525,000	440,000
NIF public works center support	6,216,000	4,954,000
Pollution abatement	2,653,000	10,945,000
Inspection radio tower	75,000	75,000
Engineering investigation	1,000,000	1,000,000
Nuclear shore power systems	490,000	490,000
Planning studies	599,000	600,000
Soil conservation	160,000	160,000
Data management	186,000	187,000
Major repair projects	1,763,000	1,476,000
Minor construction projects	720,000	720,000
Freight	5,160,000	3,903,000
Stevedoring	2,000,000	1,700,000
Total	32,871,000	38,512,000

Collateral equipment:

1972	$9,434,000
1973	10,027,000
Change	+593,000

The increase is directly related to the types and value of projects in the Fiscal Year 1972 MCON/MCNR line items with beneficial occupancy dates in Fiscal Year 1973.

MF Public Works Center support:

1972	$6,216,000
1973	4,954,000
Change	−1,262,000

The decrease results from program adjustments to accomodate higher priority requirements.

Pollution abatement:

1972	$2,653,000
1973	10,945,000
Change	+8,292,000

The increase results from including all known requirements in the FY 1973 budget in accordance with OMB memorandum of April 7, 1971.

Major repair projects:

1972	$1,763,000
1973	1,476,000
Change	−287,000

The decrease results from program adjustments to accomodate higher priority requirements.

Freight:

1972	$5,160,000
1973	3,903,000
Change	−1,257,000

The decrease is related to force level reductions.

Stevedoring:

1972	$2,000,000
1973	1,700,000
Change	−300,000

The decrease is related to force level reductions.

Pollution Abatement Listing

Chairman Ellender. Would you please provide a listing and the relative amounts of the various projects that make up this $8.3 million for pollution abatement?

Admiral Minter. Yes, sir.

(The information follows:)

Pollution abatement projects

	Activity and project description	*Cost estimate*
NCS	Adak, Alaska; classified waste destructor	$49,000
NCS	Adak, Alaska; Classified waste destructor	49,000
NAS	Lemoore, Calif.; classified waste incinerator	50,000
NAS	Moffett Field, Calif.; Classified waste destructor	29,000
NSY	(Hunters Point) San Francisco, Calif.; classified paper disintegrator	9,000
NMC	Bethesda, Md.; fuel conversion	50,000
NSR&DC	Carderock, Md.; classified waste destructor	35,000

Activity and project description	*Cost estimate*
NSR&DC Carderock, Md.; fuel conversion	50,000
NCS Cheltenham, Md.; fuel conversion	50,000
NOL White Oak, Md.; fuel conversion	50,000
NOL White Oak, Md.; classified waste destructor	50,000
NHB Chelsea, Mass.; connecting boiler to main stack	50,000
NSC Norfolk, Va.; fuel tank vapor control	16,000
NCBC Gulfport, Miss.; dust collector/combustion control	40,000
NCBC Gulfport, Miss.; dust collector/combustion control	15,000
NCBC Gulfport, Miss.; dust collector system control	20,000
NCBC Gulfport, Miss.; classified waste destructor	15,000
NH Key West, Fla.; pathological waste incinerator	10,000
NS Washington, D.C.; fuel conversion	50,000
NAS North Island, Calif.; classified material destructor	43,000
NSC Oakland, Calif.; classified waste pulper	10,000
NTS Keyport, Wash.; liquid and suspended solids incinerator	45,000
NCBC Port Hueneme, Calif.; classified material destructor	25,000
NRTC Andersen, Ind.; fuel conversion	7,000
N&MCRTC, Springfield, Ill.; new boiler	4,000
N&MCRTC Kansas City, Mo.; fuel conversion	2,000
NSA New Orleans, La.; classified waste incinerator	2,000
NF Centerville Beach, Calif.; fuel conversion	10,000
NF Coos Head, Wash.; classified waste destructor	15,000
NF Coos Head, Wash.; fuel conversion	10,000
NSA Seattle, Wash.; fuel conversion	20,000
NF Point Sur, Calif.; classified waste shredder	5,000
NF Point Sur, Calif.; fuel conversion	10,000
PWC Marianas Islands, Guam; smoke detectors	11,000
NCS San Diego, Calif.; classified waste destructor	39,000
NAS North Island, San Diego, Calif.; fuel conversion	22,000
NWS Seal Beach, Calif.; ventilation system	25,000
NWS Seal Beach, Calif.; exhaust filter system	15,000
NWS Seal Beach, Calif.; exhaust filter system	20,000
NWS Seal Beach, Calif.; exhaust filter system	15,000
NAD Crane, Ind.; acid mist collector	10,000
NAD Crane, Ind.; scrubber system	27,000
NH Boston, Mass.; fuel conversion	8,000
N&MCRTC Portland, Oreg.; fuel conversion	3,000
NRTC Seattle, Wash.; fuel conversion	15,000
NAS Meridian, Miss.; classified waste destructor	3,000
NAS Meridian, Miss.; pathological waste incinerator	6,000
N&MCRTC Tacoma, Wash.; fuel conversion	11,000
NADC Warminster, Pa.; smoke collectors and afterburners	25,000
NCS Sugar Grove, W. Va.; classified waste incinerator	3,000
NWS Seal Beach, Calif.; repair afterburner, water spray system and stack	80,000
NS Adak, Alaska; bilge/ballast receipt and treatment facility	27,000
NAS Lemoore, Calif.; improvements to sewage treatment plant	17,000
NSY Long Beach, Calif.; connecting buildings 139, 174 to sewer	23,000
NCBC Fort Hueneme, Calif.; municipal sewer connection	10,000
Headquarters, NDW (Washington Navy Yard), Washington, D.C.; sewage holding tank	5,000
NAS Jacksonville, Fla.; connecting buildings 24, 125 to sewer	5,000
NAS Jacksonville, Fla.; cooling water treatment	39,000
NAS Key West, Fla.; install oil/water separator	1,000
NAS Glynco, Ga.; repair sanitary sewer	100,000
NSC Pearl Harbor, Hawaii; replace fuel ballast line	225,000
NRTC Springfield, Ill.; municipal sewer connection	17,000
NAS Brunswick, Maine; install oil/water separator	25,000
NA Annapolis, Md.; connecting pool backwash	7,000
NA Annapolis, Md.; connecting pool backwash	9,000
NA Annapolis, Md.; loading dock oil pollution control	24,000
NSY Boston, Mass.; connecting pier toilets to sewer	91,000
NAS Lakehurst, N.J.; municipal sewer connection	50,000

Activity and project description	*Cost estimate*
NAPTC Trenton, N.J.; municipal sewer connection	25,000
N&MCRTC Buffalo, N.Y.; packaged aeration and chlorination facility	50,000
NRTC Portsmouth, Ohio; municipal sewer connection	10,000
N&MCRTC Youngstown, Ohio; municipal sewer connection	10,000
NAD McAlester, Okla.; industrial wastewater lagoon	8,000
NBS Philadelphia, Pa.; municipal sewer connection	26,000
NH Philadelphia, Pa.; municipal sewer connection	6,000
NRTC Williamsport, Pa.; municipal sewer connection	10,000
NAS Willow Grove, Pa.; municipal sewer connection	24,000
N.D. & R.F. San Juan, P.R.; municipal sewer connection	13,000
NS San Juan, P.R.; municipal sewer connection	23,000
NSC Craney Island, Va.;repair oil/water separator	15,000
NSC Craney Island, Va.; repair fuel tanks	188,000
NSC Craney Island, Va.; replace sluge line	7,000
NSC Norfolk, Va.; repair pier fuel lines	15,000
NSC Norfolk, Va.; repair pier fuel lines	80,000
NSC Norfolk, Va.; repair pier fuel lines	6,000
NSC Norfolk, Va.; Rehabilitate valve pits	15,000
NSC Norfolk, Va.; install new pipeline	211,000
NRTF Bellingham, Wash.; municipal sewer connection	8,000
NTS Keyport, Wash.; neutralize plating waste	50,000
NTS Keyport, Wash.; improve sewage system	50,000
N. & M.C.R.T.C. Tacoma, Wash.; municipal sewer connection	44,000
NAF Indianapolis, Ind.; plating waste treatment	54,000
NWRIP Bristol, Tenn.; repair waste ponds	50,000
NCS Honolulu, Hawaii; package sewage treatment plant	27,000
NCS Honolulu, Hawaii; package sewage treatment plant	14,000
NCS Honolulu, Hawaii; package sewage treatment plant	49,000
NCS Honolulu, Hawaii; package sewage treatment plant	27,000
NCS Honolulu, Hawaii; connecting buildings 5, 234 to sewer	25,000
NSY Portsmouth, Va.; connection to base sanitary sewer	17,000
NAS Whiting Field, Fla.; connecting A/C washrack	23,000
NAS Whiting Feld, Fla.; connecting garbage can washrack	24,000
NAS Saufley Field, Fla.; install oil/water separator	5,000
NH Jacksonville, Fla.; treat boiler blowdown	25,000
NH Jacksonville, Fla.; nonpolluting cooling water treatment	3,000
NRTC Wilmington, Del.; municipal sewer connection	10,000
NAS Albany, Ga.; municipal sewer connection	49,000
N. & M.C.R.T.C. Trenton, N.J.; municipal sewer connection	10,000
N. & M.C.R.T.C. Columbus, Ohio; municipal sewer connection	10,000
NRTC Lima, Ohio; municipal sewer connection	10,000
N. & M.C.R.T.C. Lorain, Ohio; municipal sewer connection	10,000
NRTC Hazelton, Pa.; municipal sewer connection	10,000
NCBC Davisville, R.I.; install head facilities	16,000
NTC Great Lakes, Ill.; municipal sewer connection	7,000
NSC Charleston, S.C.; repair fuel pier	40,000
NSC Charleston, S.C.; replace fuel piping	18,000
NSC Charleston, S.C.; treat sludge oils	40,000
NS Adak, Alaska; enlarge blowdown sump and pump	14,000
NAS Alameda, Calif.; new septic tank	7,000
NAS Alameda, Calif; sanitary sewer connection	19,000
NAS Alameda, Calif.; sanitary sewer connection	39,000
NAF El Centro, Calif.; provide new sanitary sewer	42,000
NS Long Beach, Calif.; sanitary sewer connection	3,000
NSY Long Beach, Calif.; sanitary sewer connection	15,000
NSY Long Beach, Calif.; sanitary sewer connection	6,000
NAS Moffett Field, Calif.; oil/water separator; municipal sewer connection	8,000
NAS Moffett Field, Calif.; oil/water separator; municipal sewer connection	10,000
NAS Moffett Field, Calif.; municipal sewer connection	4,000
NAS Moffett Field, Calif.; municipal sewer connection	3,000

Activity and project description	*Cost estimate*
NFD Point Molate, Calif.; repair or replace deteriorated sewer equipment	15,000
NFD Point Molate, Calif.; oil/water separator; municipal sewer connection	4,000
NCBC Point Hueneme, Calif.; sanitary sewer connection	22,000
NCBC Point Hueneme, Calif.; sanitary sewer connection	32,000
NCBC Point Hueneme, Calif.; oil/water separator, sanitary sewer connection	10,000
NS San Diego, Calif.; sanitary sewer connection	8,000
NFD San Pedro, Calif.; provide oil boom	2,000
NFD San Pedro, Calif.; construct roof for fuel storage facility	15,000
NS (T.I.) San Francisco, Calif.; sanitary sewer connection	43,000
NS (T.I.) San Francisco, Calif.; oil/water separator, sanitary sewer connection	37,000
NSB Groton, Conn.; oil/water separator, sanitary sewer connection	27,000
NAS Jacksonville, Fla.; sanitary sewer connection	6,000
NAS Jacksonville, Fla.; sanitary sewer connection	8,000
NAS Jacksonville, Fla.; construct holding lagoon	22,000
NAS Key West, Fla.; install oil collection equipment	25,000
NAS Key West, Fla.; install oil/water separator	2,000
NAS Key West, Fla.; install oil/water separator	3,000
NAS Key West, Fla.; construct tile drainfield	24,000
NAS Key West, Fla.; sanitary sewer connection	8,000
NAS Key West, Fla.; sanitary sewer connection	3,000
NAS Key West, Fla.; sanitary sewer connection	2,000
NAS Key West, Fla.; construct tile drainfield	14,000
NS Key West, Fla.; sanitary sewer connection	6,000
NS Key West, Fla.; sanitary sewer connection	4,000
NS Key West, Fla.; modification of existing clarifier	3,000
NS Key West, Fla.; emergency generator for STP	24,000
NS Key West, Fla.; inspection and repair of sanitary sewer	42,000
NS Key West; Fla.; install new fuel line	33,000
NAS Pensacola, Fla.; inspection and repair of sanitary sewer	14,000
NAS Pensacola, Fla.; oil/water separators	5,000
PWC Guam, M.I.; sanitary sewer connection	25,000
NRS Cheltenham, Md.; sanitary sewer connection	20,000
NAS Lakehurst, N.J.; sanitary sewer connection	46,000
NCS San Juan, P.R.; sanitary sewer connection	10,000
NS Roosevelt Roads, P.R.; sanitary sewer connection	50,000
NWS Charleston, S.C.; inspection and repair of sanitary sewer	104,000
NAS Chase Field, Beeville, Tex.; sanitary sewer connection	14,000
NAS Chase Field, Beeville, Tex.; install oil/water separator	8,000
NAS Chase Field, Beeville, Tex.; sanitary sewer connection	15,000
NAS Chase Field, Beeville, Tex.; install septic tank and drain field	23,000
NAS Corpus Christi, Tex.; install septic tank and drain field	17,000
NAS Corpus Christi, Tex.; oil/water separator, sanitary sewer connection	7,000
NAS Corpus Christi, Tex.; sanitary sewer connection	4,000
NAS Corpus Christi, Tex.; sanitary sewer connection	3,000
NAS Corpus Christi, Tex.; sanitary sewer connection	14,000
NAS Corpus Christi, Tex.; install oil/water separator	5,000
NAS Dallas, Tex.; oil/water separator, sanitary sewer connection	19,000
NAS Dallas, Tex.; provide septic tank and drain field	2,000
NAS Dallas, Tex.; sanitary sewer connection	2,000
NSC Craney Island, Va.; replace POL line	3,270
NCS Norfolk, (T) Driver, Va.; sanitary sewer connection	25,000
NAB Little Creek, Va.; boiler blowdown to sanitary sewer	4,000
NAB Little Creek, Va.; swimming pool backwash to sanitary sewer	8,000
NAB Little Creek, Va.; water treatment backwash to sanitary sewer	6,000
NAB Little Creek, Va.; garbage can washwater to sanitary sewer	6,000
PWC Norfolk, Va.; swimming pool backwash to sanitary sewer	12,000
NSC Norfolk, Va.; oil separator	30,000

	Activity and project description	Cost estimate
NSC	Puget Sound (Manchester), Wash.; repair oil tank	24,000
NAS	Saufley Field, Fla.; washrack wastewater to sanitary sewer	18,000
NAS	Albany, Ga.; boiler wastewater to sanitary sewer	20,000
NAS	Albany, Ga.; cooling water recirculation	15,000
NAB	Coronado (San Diego), Calif.; sewage lift station improvements	10,000
FTC	San Diego, Calif.; oil separator improvements	40,000
NAS	Kingsville, Tex.; swimming pool backwash to sanitary sewer	13,000
NH	Key West, Fla.; boiler blowdown to sanitary sewer	1,000
N&MCRTC	New Haven, Conn.; sanitary sewer connection	24,000
NAS	North Island (San Diego), Calif.; rehabilitate sewer	15,000
NAS	Chase Field (Beeville) Tex.; washrack wastewater to sanitary sewer	15,000
NAS	Chase Feld (Beeville) Tex.; chemical wastes disposal (incinerator)	15,000
NWS	St. Julians Creek (Ports) Va.; rehabilitate sewer	15,000
NAS	Meridian, Miss.; connect washrack to sanitary sewer	6,000
NAS	New Orleans, La.; washrack wastewater to sanitary sewer	5,000
NAS	New Orleans, La.; washrack wastewater to sanitary sewer	50,000
NAS	New Orleans, La.; washrack wastewater to sanitary sewer	5,000
NAS	New Orleans, La.; washrack wastewater to sanitary sewer	5,000
NAS	New Orleans, La.; washrack wastewater to sanitary sewer	25,000
NAS	South Weymouth, Mass.; oil separator	30,000
NAS	South Weymouth, Mass.; washrack	10,000
NRS	Sugar Grove, W. Va.; enlarge sewage treatment plant	45,000
NRS	Sugar Grove, W. Va.; construct settling lagoon	20,000
NCS	Norfolk (R.N.W.) Norfolk, Va.; sewage treatment plant improvements	25,000
NRS(T)	Cutler, Maine; diesel oil separator	3,000
NCS (SUPCEN)	San Diego, Calif.; industrial wastewater to sanitary sewer	9,000
NURDL	Kaneohe, Hawaii; repair and alter sewerage system	85,000
	Total	8,305,000

POLLUTION ABATEMENT INCREASE

Senator YOUNG. The exact wording of the justification says, "An increase in pollution abatement * * *" Does this mean that there is more than $8.3 million in this request for pollution abatement?

Admiral MINTER. Yes, sir.

Senator YOUNG. How much of this total request is for this purpose?

Admiral MINTER. The total request for the fiscal year 1973 is $10.9 million.

PUBLIC WORKS CENTER SUPPORT

Chairman ELLENDER. To partially offset the increase in pollution abatement, I see on 1–7–18 that there is a decrease of $1.3 million in Public Works Center Support. For the sake of the record, and to review just a bit, would you please tell the committee how many of these centers the Navy operates, where they are located, how much is provided for each in the present request, and what the basic function of the centers is?

Admiral MINTER. There are eight public works centers operated by the Navy which are supported by the funds subject to the $1.3 million reduction.

Locations of these centers and the funds provided in the present request are as follows: Newport, R.I., $558,000; Norfolk, Va., $696,000;

Pensacola, Fla., $582,000; Great Lakes, Ill., $566,000; San Diego, Calif., $658,000; Pearl Harbor, Hawaii, $832,000; Guam, Marianas Islands, $730,000; and Subic Bay, Republic of the Philippines, $332,000 for a total of $4,954,000.

The mission of the public works centers is to provide public works, public utilities, public housing, transportation support, engineering services, shore facilities planning support, and all other logistic support of a public works nature incident thereto, required by the operating forces, dependent activities, and other commands served by the public works centers.

EFFECT OF REDUCTION

Chairman ELLENDER. Would you please explain what effect this reduction of $1.3 million will have on the operational capabilities of the centers that are affected?

Admiral MINTER. The $1.3 million will result in a reduction in the level of effort applied to inspections, maintenance planning and engineering consultations within the public works centers. Necessary and essential operational capability will be retained commensurate with fleet support requirements.

FIELD ENGINEERING SUPPORT

Chairman ELLENDER. Turning now to field engineering direction and support, since we have already discussed the command and control aspects, would you please tell us how the six field engineering divisions function in carrying out their support function? Please get into the organizational structure including the size and location of the divisions in your response.

Admiral MINTER. The prime mission of the Naval Facilities Engineering Command is to support the Operating Forces of the Navy, The Marine Corps, other components of the Naval Material Command, and other offices and organizations in regard to shore facilities and related engineering material and equipment. Overall direction of this mission is provided by the Headquarters office in Washington, D.C.

To provide responsive service to naval commands and activities throughout the shore establishment, execution of this mission is decentralized into six geographic engineering field divisions which are similar to headquarters in both organizational structure and operational programs. These engineering field divisions operate within a framework of objectives established by headquarters and provide support to major claimants and their subordinate activities within the respective engineering field division geographical areas.

I will submit for the record a listing of these divisions, their location, and staffing.

(The information follows:)

The six Engineering Field Divisions are as follows:

Division, Location, and approximate staffing:

Northern, Philadelphia, Pa	485
Chesapeake, Washington, D.C	531
Atlantic (including outlying "Offices in Charge of Construction"), Norfolk, Va	521
Southern, Charleston, S.C	554
Western, San Bruno, Calif	848
Pacific (including outlying "Offices in Charge of Construction"), Pearl Harbor, Hawaii	1,273

These field division offices are funded from approximately 65% MCON and 35% O&M,N operational programs.

CONSTRUCTION BATTALION SUPPORT

Chairman ELLENDER. On page 1-7-19, we come to an item for construction battalion support. As I recall, there are other items in this justification pertaining to construction battalions in addition to this one and I wonder if you would consolidated the entire request for these battalions into one table to be placed in the record at this point. Please show the comparative figures for 1972 as well.

Admiral MINTER. This line item is for construction battalion center operations. The construction battalion centers are the Navy stock point for civil engineer support material; serve as the homeport for the naval construction forces and provide berthing, messing, and training of these forces while in a homeport status; serve as the active duty training site and weekend training of reserve naval construction force units; provide common service support to tenant activities and perform a variety of civil engineering functions required in the execution of logistic responsibilities assigned to the Naval Facilities Engineering Command. That portion of this item applicable to naval construction forces homeport berthing, messing, training, and other logistic support is included in the table I will submit for the record.

(The information follows:)

CONSTRUCTION BATTALION SUPPORT

[In thousands of dollars]

Nomenclature	Program	Budget activity	Fiscal year— 1972	1973
Special combat support forces (NMCB portion)	D	2	17,409	12,843
Construction battalions (commands)	F	2	3,301	3,060
Construction battalion centers (NMCB support)	E	7	7,160	7,160
Total			27,870	23,063

PEACETIME MISSION OF CONSTRUCTION BATTALIONS

Senator YOUNG. Now that the battalions have been withdrawn for Vietnam, would you please give the committee an idea of the peacetime mission and capability of these units as a whole, not merely in relation to the supply and maintenance budget activity?

Admiral MINTER. The peacetime mission of the naval mobile construction battalions (NMCB's) is to develop unit teamwork and skills needed to maintain a state of operational readiness necessary for the provision of rapid and effective construction support to naval, Marine Corps, and other forces in time of contingencies. In addition, the battalions maintain the capability to conduct disaster recovery operations during natural or manmade disasters. To accomplish this readiness mission, NMCB's are employed on Navy new construction, alterations, repair or maintenance projects that will attain and maintain this proficiency. Battalions are rotated to overseas sites on a cycle of 8 months deployed and 6 months in the homeports. The current major overseas deployment sites are Diego Garcia, Rota, Okinawa, Guam, Puerto Rico, and Antarctica. These battalions have the capability to deploy with their equipment to any area in the world within 6 days' notice. The fleet commanders in Chief's backlog of work proposed for Seabee accomplishment consists of operational and personnel support

facilities for the Navy and civic action endeavors (such as currently being done in the Trust Territory of the Pacific Islands) by Seabee teams formed from the battalions.

Supply Depot Operations

Chairman Ellender. Supply depot operations account for $124.5 million of the total $355.2 million requested for supply support in fiscal year 1973. This is a reduction of $4.7 million from the revised 1972 estimate of $129.2 million and reflects "projected reductions in force level supply support workload and facilities management functions." What specific reductions are being made due to the reductions in force level support and facilities management?

Admiral Wheeler. The $4.7 million reduction is a net decrease which reflects a reduction of $4.5 million in projected supply workload requirements as a result of force decreases and a reduction of $2.2 million in facilities management costs, partially offset by an increase of $2 million for pay increases, health benefits insurance costs, and functional transfers.

Chairman Ellender. Would you please explain to the committee what the reductions in support means in terms of the number of personnel employed at the various depots. Please furnish a listing of the depots in the response with the number of civilians and military personnel employed by each in 1972 and 1973.

Admiral Wheeler. As a result of reductions in force level supply support and facilities management functions, the number of personnel employed in supply depot operations wil be be decreased in fiscal year 1973 by 680 civilian and 51 military billets. I will supply a list of the individual activities showing civilian and military end strength for fiscal years 1972 and 1973.

(The information follows:)

Activity	Fiscal year 1972		Fiscal year 1973		Reduction	
	Civilian	Military	Civilian	Military	Civilian	Military
Naval supply centers:						
Norfolk, Va.	3,175	76	3,175	69		7
Oakland, Calif.	2,670	90	2,522	78	148	12
Charleston, S.C.	1,010	32	1,000	32	10	
Long Beach, Calif.	660	22	442	16	218	6
San Diego, Calif.	824	36	824	34		2
Pearl Harbor, Hawaii	788	42	779	36	9	6
Puget Sound, Wash.	533	20	366	11	167	9
Newport, R.I.	502	23	374	17	128	6
Navy Publications and Forms Center, Philadelphia, Pa.	904	18	904	15		3
Navy Fuel Depot, Jacksonville, Fla.	32	1	32	1		
Total	11,098	360	10,418	309	680	51

Supply Management

Senator Young. In the supply management area, where you are requesting $86.7 million, down $4.1 million from the revised 1972 estimate, would you please explain specifically how this reduction is effected. You indicate that it is related to projected reductions in workload, but you don't say how these reduced workloads result in the savings indicated.

Admiral WHEELER. The decrease of $4.1 million is a net amount which reffects a reduction in projected fleet support workload resulting from force level decreases, $2.8 million; logistics support programs, $2.7 million; facilities management functions, $0.2 million; and command staffing, $0.2 million. These decreases are partially offset by cost increases related to pay raises and health benefits insurance payments amounting to $1.8 million.

COMMISSARY STORE ACTIVITIES

Chairman ELLENDER. The only activity in the other supply activities and support program that is realizing an increase in 1973 is the commissary stores program. Part of the increase in this program is justified by increased sales workload. I would like you to explain how you arrive at the conclusion that there would be an increase in the sales workload. It would appear that with a reduction in the force levels, there would be a corresponding reduction in the sales workload. Would you please explain this seeming paradox?

Admiral WHEELER. A decrease in active force levels does not necessarily indicate that a corresponding reduction in the sales workload at commissary stores will follow. The majority of personnel affected by reductions in force are in the lower enlisted grades, and generally do not fully utilize the commissary store facilities as they subsist in the generall messes. Conversely, the number of retirees who generally, with their families, do fully utilize the commissary outlets, has increased. People who live on fixed incomes rely more heavily on commissary store privileges in a period of consistently rising food prices.

Chairman ELLENDER. Another portion of the increase is in regard to the proposed establishment of two new stores. Would you please tell the committee where these two new stores are to be located, whether they are to replace already existing stores, how much is requested for each store, and why these additional outlets are needed in a time when force levels are being reduced? That is to say, please tell us in detail what this request is all about.

Admiral WHEELER. One of the proposed commissary stores is to be located at the Naval Communication Station, Harold E. Holt, Exmouth, Western Australia. A Navy Exchange (NEX) Grocery Section is to be converted to a commissary store and will not replace an existing store. The scheduled opening date is October 1, 1972. During fiscal year 1973 $24,000 for civilian staffing is required. The new store will provide for 200 families and 280 single personnel at this location. Support is currently provided by the NEX Grocery Section at a far greater markup than would be imposed by a commissary store. This results in dissatisfaction and is detrimental to morale.

A second proposed store is to be located at the Navy Supply Corps School in Athens, Ga. It is to be a branch of the Navy Commissary Store, Charleston, S.C. Scheduled opening date is also October 1, 1972. Staffing funds of $139,000 for this facility is requested. It will be a new store and will not replace an existing outlet. It is needed to support 757 families and 1,100 other authorized patrons. Presently, the nearest commissary facility is 75 miles away. This new outlet would boost morale, financially aid personnel attending the Navy Supply Corps

School, and enhance recruitment and retention of Supply Corps officers.

NAVAL MATERIAL COMMAND AND SUPPORT PROGRAM

Chairman ELLENDER. On page 1-7-23, you indicate that the increase in the Naval Material Command and Support program from $21.5 million in 1972 to $41.7 million in 1973 is due entirely to the transfer of employee compensation payments, which are made to the Department of Labor's employment compensation fund, from Budget Activity 9. Would you please explain to the committee why this transfer was made?

Admiral MINTER. The responsibility for budgeting for employee compensation payments was transferred from Budget Activity 9 to Activity 7 to place the function in the same activity providing management direction and support for most of the Navy's industrial-type activities. The majority of payments result from accidents and injuries occurring at these naval industrial and maintenance-oriented field activities. It was, therefore, considered more appropriate to fund accident benefits and compensation here rather than in a budget activity primarily related to administration functions.

BUDGET ACTIVITY 8—TRAINING, MEDICAL, AND OTHER GENERAL PERSONNEL SUPPORT

The fiscal year 1973 request for "Training, medical, and other general personnel support" totals $675.9 million which is an increase of $43.7 million over the request for fiscal year 1972.

Chairman ELLENDER. Does "Medical support" contain any moneys used to educate physicians for the Navy?

Admiral DAVIS. Yes, sir. We have 200 into that program right now.

Chairman ELLENDER. How do you handle that? Do you select the colleges at which the student is to take his training?

Admiral DAVIS. No, sir, we have not to date. We may be guided differently later on. This is our third year. We have 2 years' experience with the program. We have some students in those schools that are listed as those that have cut out the ROTC.

Chairman ELLENDER. Is it your plan in the future to continue to permit the student to choose the college?

Admiral DAVIS. The plan is to continue to do that until the Department of Defense guides us about how else to proceed. Our usual manner is to select the boy after he has applied to a medical school and been accepted. Once he is accepted, then it is a highly competitive program because we have many more applicants than we have vacancies to fill. We have been able to select a very high grade student but they are distributed throughout the country.

MEDICAL SUPPORT PROGRAM

Chairman ELLENDER. Would you put in the record 10 typical examples of colleges so utilized and the cost to the Government per year for each student?

Admiral DAVIS. I will; yes, sir.

(The information follows:)

Louisiana State University School of Medicine	$800.00
University of Mississippi School of Medicine	855.99
University of Colorado School of Medicine	927.00
University of Missouri School of Medicine	1,570.00
Duke University School of Medicine	2,265.00
University of Nevada School of Medical Science	406.00
University of Virginia School of Medicine	1,870.00
University of Iowa College of Medicine	870.00
University of Texas Medical School at San Antonio	377.00
Medical University of South Carolina	1,000.00

EXPANDED PROGRAMS

Chairman ELLENDER. Continue.

Admiral MINTER. Of this amount, $8.4 million is for expanded programs in drug and alcohol education; rehabilitation of personnel support facilities; and for race and intercultural relations programs; $9.8 million covers increased costs of obtaining qualified personnel under an All Volunteer Force concept; and $19.3 million is for medical support primarily due to increased utilization of the CHAMPUS program. The remaining $6.2 million includes $4.9 million for full year costs of the January 1972 classified pay raise, and $1.3 million for support of new and expanded training programs.

In order to successfully carry out our role in national defense, the Navy must provide necessary training and education opportunities to the young men and women who comprise the naval service. The importance and complexity of naval training and education grows each year as modern defense systems are developed and introduced for service use. Training and education responsibilities for which we are requesting $237.2 million in fiscal year 1973 range from kindergarten for eligible dependents in the Atlantic Overseas Dependents Schools Area to postgraduate curricula for career officers in the postgraduate schools and in civilian education institutions.

POSTGRADUATE EDUCATION

Chairman ELLENDER. Do any of these students attend schools that are maintained by the Government, or are they all private?

Admiral MINTER. We have postgraduate education in our own postgraduate school at Monterey. We also have postgraduate education in private universities as well, depending on the particular area in which the young man is getting the degree.

EDUCATION OF CHILDREN OF OVERSEA PERSONNEL

Chairman ELLENDER. The $237 million seems to be quite a large sum. Does that cover the education of all children——

Admiral MINTER. No, sir. Only those residing overseas in the Atlantic area.

Chairman ELLENDER. In the employ of the Navy?

Admiral MINTER. Yes, sir, these are dependents of Naval personnel and also include Army and Air Force dependents.

Chairman ELLENDER. Do any of our civil service employees participate?

Admiral LAMBERT. Dependents of other Federal agencies attend on a reimbursable basis. This money is for all Department of Defense dependent children in the areas where the Navy has executive responsibility. The Atlantic area. This is where we provide the education for these particular children. In other areas the Army and the Air Force have similar responsibilities.

Chairman ELLENDER. But yours is strictly in the Atlantic area?

Admiral LAMBERT. Yes, sir. Our overseas responsibility is met by operating 14 schools in eight different locations in the Atlantic area and by using private schools.

Chairman ELLENDER. What portion of the $237.2 million is to pay for the education of dependents?

Admiral LAMBERT. $19 million is for overseas dependent schools in the Atlantic area.

NAVYWIDE TRAINING AND EDUCATION

Chairman ELLENDER. And the rest is for what?

Admiral PLATE. It covers recruit training, Naval Academy.

Admiral MINTER. This is not just schools. This is all training. It is for training Navy-wide.

Admiral LAMBERT. Training and education Navy-wide within the United States as well as overseas dependent schools.

Captain BROCK. $95 million alone is for flight training.

Chairman ELLENDER. Please provide for the record the amounts requested for the various categories.

Admiral MINTER. We will provide you with a breakdown.

(The information follows:)

Navy Training and Education

Recruit training	$1,992,000
Specialized training	46,603,000
Surface/subsurface	(30,566,000)
Aviation	(15,660,000)
Medical	(377,000)
Professional training	26,346,000
General	(20,726,000)
Medical	(5,620,000)
Flight training	94,828,000
Overseas dependents schools	19,021,000
Naval Reserve Officer Training Corps	11,050,000
Other training support	10,796,000
Naval Academy	26,593,000
Total	237,229,000

MEDICAL CARE TO MEMBERS AND BENEFICIARIES

Admiral MINTER. Another important Navy support function is the provision of necessary medical care to active duty members and other authorized beneficiaries. To assist in this responsibility, we are requesting $301.6 million for support of medical activities under command of the Surgeon General, including 38 naval hospitals, four medical centers, three naval dispensaries, 11 dental activities, and various specialized medical activities. The request also includes provision for inpatient and outpatient care in nonservice facilites, and for care of the dead.

Our naval hospitals will have an average daily patient load of 8,368; will provide care for approximately 10.6 million outpatients, and

render 31.4 million services for these outpatients. An additional average daily patient load of 3,541 will be provided care in other Federal and civilian institutions.

Recruitment of Doctors

Chairman Ellender. Are the doctors who serve at these various facilities provided through voluntary services?

Admiral Minter. These are officers in the Medical Corps in the Navy and the Surgeon General can discuss this in more detail.

Admiral Davis. Two-thirds are draft dependent. Every year we lose one-third of our Medical Corps physicians and they are replaced by the draft.

Scholarship Program

Chairman Ellender. Going back to the scholarship program, how long must the individual stay in the service?

Admiral Davis. He must stay 5 years in the service for a 4-year period of school. We would hope that during these 5 years, we can interest him in specialization so that he will obligate himself further. We have generally found if we can get 10 to 12 years he may elect the service as a career.

Chairman Ellender. There is no obligation except during the 5-year period?

Admiral Davis. Five years for 4 years of schooling.

Admiral Minter. That is the same requirement for the Naval Academy, Mr. Chairman. Five years obligated service after graduating.

Personnel Support

The remaining $137.1 million under this budget activity is for personnel support including drug and alcohol education and rehabilitation; programs in human relations; centralized personnel distribution; morale and discipline functions of personnel management; the all-volunteer force program; and annual operation and maintenance cost of the facilities at training stations. In addition, operation and maintenance support is provided for the U.S.S. *Lexington* which is primarily for carrier landing qualifications in flight training.

Training, Medical and Other General Personnel Support

Chairman Ellender. Before we get into even the first item in the Training, Medical, and Other General Personnel Support budget activity, I want to insert into the record a comparison of the original 1972 estimates and the 1972 estimates that appear in the justification for funding in 1973.

(The information follows:)

Budget program	Original 1972	Revised 1972
Training	$200,047,000	$206,148,000
Naval Academy	25,790,000	26,469,000
Personnel support	46,949,000	53,547,000
Base operations	63,274,000	67,127,000
Medical support	226,570,000	278,950,000
Total	562,630,000	632,241,000

Chairman ELLENDER. I think you will have to agree that the difference is substantial. Would you please explain in detail, the reasons for the increase?

Admiral MINTER. Yes sir. I will provide that for the record.

(The information follows:)

Budget Activity 8

[In thousands]

Initial congressional submission	$562,630
Jan. 1, 1971, pay raise amendment	+9,693
Subtotal	572,323
Drug rehabilitation amendment	+2,826
Fiscal year 1972 President's budget, amended	575,149
Congressional actions	−3,034
Fiscal year 1972 enacted	572,115
CHAMPUS	+37,500
Civilian health benefits	+268
Dollar reevaluation	+112
GSA leases (transfer to GSA)	−7
Medical facilities, operating costs	+3,700
Outpatient facilities expansion	+987
Eye glasses, plastic/tempered lens	+300
On-going medical ADP programs	+500
Nurse's baccalaureate program	+200
Alcohol rehabilitation clinic	+100
Human relations program	+4,500
Fuel and utilities cost escalation	+3,200
Other increases	+204
ADP equipment lease savings	−263
Functional transfers (realinement from other budget activities)	+1,751
Pay raise supplemental	+7,074
Fiscal year 1972 column of fiscal year 1973 President's budget	632,241

1972 FUNDING CHANGES

Chairman ELLENDER. Now that we have addressed the 1972 differential problem, lets turn to the 1972 revised versus the 1973 budget request. From the figures on page 1–8–1, I notice that the training program has an increase of $4.5 million budgeted for 1973. This training is broken down into recruit, specialized, professional and flight training and then overseas dependents schools, ROTC and other training support and we will take these one at a time. On page 1–8–2, I notice that you are increasing the funds requested for recruit training by some $500,000. You justify this by saying that it is required to support an increase of 8,674 people in the average training load, up from 20,732 in 1972 to 29,406 in 1973. Would you please explain to the committee what you mean by the average training load. Is that the average per month or what?

Admiral LAMBERT. Yes. Average training load means the average number of students in training each day of the year. It is computed for the past year by adding the loads on board at the end of each month and dividing by 12. Projected loads are calculated, for recruit training, by dividing the anticipated input for the fiscal year by 5 (50 weeks in the year divided by 10, the length of time the average recruit is in recruit training, including his in and out processing).

Training Load Increase

Chairman Ellender. With what appears to be a dramatic increase in your average training load, I wonder why you have requested an increase of only $500,000? Would you explain how you are able to do this?

Admiral Lambert. The load is predicated to rise about 40 percent in fiscal year 1973 above fiscal year 1972 and the funding has been calculated a little less than a 40 percent increase.

Specialized Training

Chairman Ellender. On page 1–8–3 an increase of $2 million is budgeted for specialized training to support an increase of 3,200 onboard in specialized training. The narrative indicates that the increase is for several reasons; the increased pay raise; new electronics training; increased usage of individualized instruction; and attendance of Naval Reserve personnel in class A schools. Would you please provide the committee with a breakdown of the amounts requested for each of the increases indicated?

Admiral Lambert. The following is a breakdown of the amounts requested for each: Pay raise, $785,000; new electronics training, $142,000; individualized instructions, $752,000; and Naval Reserve in class "A" schools, $1,068,000.

Chairman Ellender. Would you also please indicate how much is already provided in the budget for the purpose you mention the increases will be applied to and explain why these increases are necessary?

Admiral Lambert. Electronics training and attendance of Naval Reserve personnel in class "A" schools take place in the conglomerate of training at several activities. It is not feasible to break out the funding for these purposes since they are integral parts of many classes at many activities.

The additional electronics training will encompass the introduction of several new equipments on ships.

These new equipments will feature the use of total weapon system concepts. This concept incorporates the use of advanced technology, electronic warfare, intelligence, defensive and offensive systems reacting to evaluations and commands emanating from and through new and highly sophisticated third generation computers. Each subsystem will be extremely critical in terms of ship survival and mission capability. New courses and new schools using advanced training techniques will have to be developed to support maintenance, operator, and system requirements.

The program of individualized instruction is designed to give emphasis to new techniques of instruction which permits students to progress at their own pace. It will increase the quality and efficiency of conventional education and training programs. The experimental use of individualized instruction methods in Navy schools has resulted in an increased student learning proficiency of 10 percent and has materially reduced average course lengths. Upon his arrival at a training school, the student is tested to measure his skills. Armed with this knowledge, a training plan is drawn up to augment his present skills,

utilizing programed instruction, films, and instructors in the proportions most suitable to the individual.

The Naval Reserve requirement for class "A" schools contemplate substantial increases in the training of additional Reserve personnel at 22 class "A" schools to insure competence in technical and administrative ratings. This new Reserve training will be accomplished in 21 ratings.

Class "A" Schools

Senator Young. Would you please explain what this item of "attendance of Naval Reserve personnel in class 'A' schools" is for?

Admiral Lambert. With the current effort to emphasize the training of Reserves under the total force concept, more Reserve personnel are being given technical training in regular Navy class "A" schools while they are on inactive duty. This prepares the Reserves to be more useful when they enter active service and to improve their qualifications in producing a strengthened Naval Reserve when they return to inactive status.

Professional Training

Chairman Ellender. There is an increase of $600,000 in professional training. Would you please tell the committee how much of this increase is attributable to increases in the cost of such training and how much is for new programs? Would you also please go into more detail on why these new programs and increased participation in older programs is essential at this time?

Admiral Davis. The $600,000 increase in training will provide for three new medical programs and expansion of on-going medical programs. These programs are designed to fulfill two objectives, increased expertise in providing for our patients and as a procurement/retention incentive for health professionals. Of the new program $100,000 is to provide a new hospital corpsman training system to upgrade our paraprofessionals, $50,000 to train our surgical teams for emergency deployment, and $98,000 for a scholarship program to recruit medical allied science personnel. Expansion of the current training program essentially expands the program to include subprofessional personnel in our enlisted corps in the programs.

Aviation Fuel

Chairman Ellender. In regard to flight training, which you have on pages 1–8–4 and 1–8–5, you indicate an increase of a little over $100,000 but in that total there is an increase of $800,000 in aircraft operations. On page 1–8–5, you indicate that the increase is due to the increase in flying hours but in the table on that page you show that there is a shift in the mix of training from jet and helo pilot training to prop. As I understand it, this is a shift from the more expensive aircraft to the least expensive, yet there is an increase in aircraft operations—would you please explain this?

Admiral Minter. The increase of $798,000 for aircraft operations results from an aviation fuel price increase amounting to $753,000 and $45,000 due to the increased flight hours. As discussed previously the aviation fuel price increase is from 12.3 cents per gallon to 12.8 cents

for jet fuel and from 17.0 cents per gallon to 17.4 cents for aviation gas. The $45,000 increase for flying hours is a net result of the increased prop pilot training offset by the decrease in jet and helo training and decreases in support areas such as the C–54 and T–33 which drop from inventory.

Overseas Dependents Schools

Chairman Ellender. Also on page 1–8–5 you deal with the Overseas Dependents Schools. The request for 1973 reflects an increase of $1.5 million over the revised 1972 estimate and is attributed to the increase in the cost of tuition fee schools, increased enrollments in service operated schools and of course, salary increases. Would you please breakdown the total increase into these general categories?

Admiral Lambert. Mr. Chairman, I will provide the details of that increase for the record.

(The information follows:)

1. Tuition fee increases	+$911,000
Canal Zone	+858,000
Other tuition fee	+53,000
2. Salary increases	+247,000
Public Law 86–91 personnel	+166,000
Class act personnel	+22,000
Within-grade step increases for all categories of personnel	+59,000
3. Increased enrollment (additional personnel)	+91,000
8 New teachers	+84,000
1 New clerk	+7,000
4. Other increases	+238,000
Para-professionals	+75,000
Increases related to personnel services	+82,000
Other program increases	+81,000
Total increase	+1,487,000

Senator Young. Would you also please explain the tuition-fee school increase a bit more, including such items as a comparison of the number of enrollees in 1972 and 1973, the number of school participating in those years, the average cost per student charged by these schools, and anything else you think might give us a better idea of what the program entails?

Admiral Lambert. In the Canal Zone, the Department of Defense is required by law to enroll its dependents in schools operated by the Canal Zone Government. In effect, the costs of DOD are determined by the Congress when it approves the Public Works appropriation for the Canal Zone Government which includes the program for the Canal Zone school system.

In other overseas areas, where conditions preclude the establishment of DOD schools and there are no adequate free schools available, we must utilize the tuition-fee schools that are reasonably adequate according to U.S. standards and pay the assessed tuition costs. Here, too, there is little or no flexibility in determining costs. Currently Navy is

utilizing approximately 100 tuition-fee schools in 45 overseas areas to educate DOD dependents.

Estimated enrollment and costs for fiscal year 1972 and fiscal year 1973 will be provided for the record.

(The information follows:)

	Fiscal year 1972			Fiscal year 1973		
	Enrollment	Total cost	Average tuition fee	Enrollment	Total cost	Average tuition fee
Canal Zone schools	7,500	$10,654,000	$1,421	7,500	$11,512,000	$1,53
Other tuition fee	1,100	992,000	902	1,054	1,045,000	99

Chairman ELLENDER. To back up just a moment, it has been brought to my attention that in last year's justification you requested $6 million to operate the service schools for some 5,500 military dependents and in this year's justification you are asking for $6.4 million to support the education of 5,000, yet in the justification you say that part of the $1.5-million increase overall is due to increased enrollments in service operated schools. Please explain this. From your estimates, it appears that you are actually going to experience a reduction in the number of enrollees in 1973.

Admiral LAMBERT. In the original fiscal year 1972 request kindergarten enrollment reflected actual numbers. In the revised fiscal year 1972 estimate and the fiscal year 1973 request kindergarten enrollment reflects average daily membership (ADM). This in effect reduces reported kindergarten enrollment by 50 percent kindergarten is only a half-day session. I would like to provide for the record how the original fiscal year 1972 request should be adjusted to read.

(The information follows:)

	Original fiscal year 1972 request		Adjusted fiscal year 1972 request	
	Enrollment	Total cost (millions)	Enrollment	Total cost (millions)
Kindergarten	538	----------	269	----------
Grades 1 to 12	4,952	----------	4,952	----------
Total	5,490	$6.0	5,221	$6.0

The revised fiscal year 1972 enrollment based on actual experience did reflect a decrease in enrollment from that estimated in the original fiscal year 1972 request. The increases from the revised fiscal year 1972 request are summarized below:

	Revised fiscal year 1972 estimate		Fiscal year 1973 request	
	Enrollment	Total cost (millions)	Enrollment	Total cost (millions)
Kindergarten	221	----------	228	----------
Grades 1 to 12	4,527	----------	4,729	----------
Total	4,748	$5.9	4,957	$6.4

NROTC

Chairman ELLENDER. Moving on to the Naval Reserve Officer Training Corps (NROTC) at the bottom of page 1–8–5, I see that you will be maintaining that program at approximately the same level as last year. Does that mean that there will be no new junior or senior programs instituted in the coming fiscal year or do you expect to have some of these programs switched around? If there are to be any new units established, I wish you would provide a list, with the location, for the record.

Admiral LAMBERT. The Project Volunteer portion of the budget contains $842,000 for an addition 500 students in the NROTC program. These are in addition to the data shown on page 1–8–5. There are no additional funds shown in this O. & M.N. budget for the NJROTC program due to the unintentional omission from the Project Volunteer portion in late stages of review at the OSD level in formulation of the budget. However, the selection process for 50 new units has now been completed and the locations announced by the Secretary of the Navy. It will be necessary to fund the new 50 units—about $540,000—by economies in other currently undetermined areas. The tentative list of new NROTC and NJROTC units programed to commence instruction in the fall of 1972 will be provided for the record.

(The information follows:)

1. University of Florida, Gainesville, Florida
2. Texas A&M University, College Station, Texas
3. North Carolina Central University, Durham, North Carolina
4. Florida A&M University, Tallahassee, Florida
5. University of West Florida, Pensacola, Florida

The list of 50 new NJROTC schools programmed to start in the Fall of 1972 follows:

NEW HOST NJROTC SCHOOLS FOR FALL 1972

ALABAMA

Headland High School
Sporman St.
Headland, Ala. 36345

ARIZONA

Coronado High School
2501 North 74th St.
Scottsdale, Arizona 85257

Moon Valley High School
3625 West Cactus Rd.
Phoenix, Arizona 85029

CALIFORNIA

Analy Union High School
6980 Analy Ave.
Sebastopol, California 95472

Bishop Union High School
301 North Fowler St.
Bishop, California 93514

Dana Hills High School
33333 Golden Lantern
Dana Point, California 92629

Thomas A. Edison Senior High School
1425 South Center St.
Stockton, California 95206

Tulare Western High School
824 West Maple Ave.
Tulare, California 93274

Centennial Senior High School
2606 North Central Avenue
Compton, California 90222

Verdugo Hills Senior High School
10625 Plainview Ave.
Tujunga, California 91042

CONNECTICUT

Griswold High School
Slater Ave.
Jewett City, Conn. 06351

FLORIDA

Bishop Kenny High School
1055 Kingman Ave.
Jacksonville, Florida 32207

Clay High School
P. O. Box 608
Green Cove Springs, Florida 32043

Titusville Astronaut High School
800 Holder Rd.
Titusville, Florida 32780

GEORGIA

Brunswick High School
3920 Habersham St.
Brunswick, Georgia 31520

Glynn Academy High School
Mansfield St.
Brunswick, Georgia 31520

Valdosta High School
1300 Williams St.
Valdosta, Georgia 31601

North Cobb High School
Old 41 Highway
Acworth, Georgia 30060

Westside High School
1002 Stelling Rd.
Augusta, Georgia 30907

Wrens High School
P.O. Box 526
Wrens, Georgia 30833

IDAHO

Rigby High School
125 North 1st West
Rigby, Idaho 83422

INDIANA

Pike Township High School
6701 Zionsville Rd.
Indianapolis, Ind. 46268

KENTUCKY

Bourbon County High School
Paris, Kentucky 40361

LOUISIANA

Baker Senior High School
Groom Rd.
Baker, La. 70714

Istrouma Senior High School
3730 Winbourne Ave.
Baton Rouge, La. 70808

Episcopal High School
3200 Woodland Ridge Blvd.
Baton Rouge, La. 70808

Lafayette High School
West Congress St.
Lafayette, La. 70501

McKinley Senior High School
800 East McKinley St.
Baton Rouge, La. 70802

MICHIGAN

Benjamin Franklin High School
31000 Joy Road
Livonia, Michigan 48150

MISSISSIPPI

Southeast Lauderdale High School
Rte. 7
Meridian, Mississippi 39301

MISSOURI

Hannibal Senior High School
4500 McMasters Ave.
Hannibal, Missouri 63401

NEW JERSEY

Keansburg Jr./Sr. High School
140 Port Monmouth Rd.
Keansburg, N.J. 07734

NEW YORK

Saint John the Baptist Academy High School
1406 Park St.
Syracuse, New York 13208

NORTH CAROLINA

McDowell High School
Rt. 4
Marion, North Carolina 28752

SOUTH CAROLINA

Eau Claire High School
4800 Monticello Rd.
Columbia, South Carolina 29203

Strom Thurmond High School
Rte. 1 Box 82
Johnston, S.C. 29832

TEXAS

Antonian College Preparatory School
6425 West Ave.
San Antonio, Texas 79835

Sanutillo High School
P.O. Box 100
Canutillo, Texas 79835

Fabens High School
300 Northeast Camp P.O. Box 692
Fabens, Texas 79838

Wilmer-Hutchins High School
Miller Ferry Rd.
Hutchins, Texas 75141

UTAH

Uintah High School
161 North 10th St.
Vernal, Utah 84078

Cottonwood High School
5715 South 1500 East
Salt Lake City, Utah 84117

VIRGINIA

Frank W. Cox High School
1848 Great Neck Rd.
Virginia Beach, VA 23454

Granby High School 7101 Granby St.
Norfolk, VA 23505

Kempsville High School
574 Kempsville Rd.
Virginia Beach, VA 23462

Lake Taylor High School
1384 Kempsville Rd.
Norfolk, VA 23502

Manor High School
1401 Elmhurst
Portsmouth, VA 23701

Tabb High School
Yorktown, VA 23490

WASHINGTON

Edmunds Senior High School
7600 212th St. S.W.
Edmunds, Washington 98036

Issaquah Senior High School
Box L
Issaquah, Washington 98027

NAVAL ACADEMY

Senator YOUNG. Also on page 1-8-6 is the request for the Naval Academy which is essentially the same this year as last. The increases in this year's program are aimed at providing "further academic improvements to make the Academy more competitive with major civilian universities in the recruitment of outstanding high school graduates * * *" I did not realize that there was such great competition between the Academy and other universities. Would you please tell the committee what this competition is, as you see it, and now it has affected applications and admissions to the Academy? Perhaps some statistics regarding the number of applicants over the past few years and their average entrance exam scores and the like will be available to prove the point.

Admiral LAMBERT. Competition for the brighter high school graduates has always been keen particularly in the recruiting of top scholars in minority groups. Most universities offer financial scholarships to top high school graduates. We have been increasingly pleased, however, with the selectivity of our applicants. In 1971, 72 percent of our candidates graduated in the top one-fifth of their class. Similar figures for prior years are not available but, intuitively, we judge the quality seems to be improving over previous years.

I would like to provide some additional statistics for the record which I think you will find interesting.

(The information follows:)

Applicants:

Fiscal year 1968	5,467
Fiscal year 1969	6,038
Fiscal year 1970	7,076
Fiscal year 1971	7,297
Fiscal year 1972	7,398

Some additional statistics for those candidates selected for entrance in 1971, for which no comparative figures are available but which are, never-the-less, meaningful, apply to the 1971 candidates who—

	Percent
Held high school academic awards or medals	39
Held scholarships to universities	35
Belonged to a National Honor Society	37
Were valedictorian/salutorians of their high school class	7
Class or student body officers	36
National Merit scholars	10
Lettered in a varsity sport	81
Were active in school clubs	66
Belonged to youth service groups	68
Were Eagle Scouts	9

Scholarship Program

Chairman Ellender. Has the ROTC scholarship program had any influence on the "competition" you refer to?

Admiral Lambert. The NROTC scholarship program and the U.S. Naval Academy have been companion sources of able naval officers since 1946 when the scholarship NROTC program was authorized by the Congress. Essentially, then, the Academy and the NROTC offer the prospective officer candidate a choice of avenues to a commission. He can select the path he likes best. In this way, the two officer candidates program supplement each other, rather than being in competition.

Personnel Support Program

Chairman Ellender. On page 1–8–7 and 8 you address the personnel support program, for which you are requesting an additional $16.5 million over the revised 1972 estimate. This increase is distributed as following: $0.3 million for recruiting of military personnel; $6.4 million for personnel support programs; and $9.8 million for Project Volunteer. With regard to the recruiting increase, the largest individual increase in this program is $0.5 million for "rise in applicant travel, lodging and subsistence." This increase is due to "increase of 38,887 over 99,445 in fiscal year 1972 in accessions required to meet manning levels and to assure sufficient petty officers." Would you please explain why such a great increase in accessions will be required in fiscal year 1973 and how this is related to the half-million dollar increase for travel, and so forth?

Admiral Plate. The substantial increase in accessions required in fiscal year 1973 is needed in order for Navy to meet the fiscal year 1973 enlisted man-year average, based upon anticipated retention and driven high by the large number of losses expected from men terminating their first enlistment from the peak strength year of 1969.

The increase of $0.5 million for travel, lodging and subsistence was obtained by multiplying the number of increased accessions, 38,887, by a factor of $14.15 per accession. These costs relate to applicants processed at Armed Forces Entrance and Examination Stations (AFEES) where determination is made on mental and physical qualifications. The average cost of $14.15 per nonprior service applicant includes $8 for travel and $6.15 for lodging and subsistence. Budgetary constraints precluded any price increases. Recently, the Commander, Navy

Recruiting Command, was advised by the Department of the Army of a proposed increase of +$3.00 in per-applicant lodging and subsistence charges. The increase is necessitated by the Army's effort to upgrade the AFEES operations. If approved, an additional $415,000 will be required for a total requirement of $695,000.

PROGRAM INCREASES

Chairman ELLENDER. The major portion of the increase in the personnel support program is in the drug abuse and alcohol education and rehabilitation, and race and interculture relations areas, which will receive $6.3 of the $6.4-million increase requested. Would you please indicate to the committee what was provided in fiscal year 1972 for these two programs and how much, other than the $6.3-million increase, is already in the base request?

Admiral PLATE. I would like to provide that for the record, sir.

(The information follows:)

The fiscal year 1972 base level of funding for these programs other than the $6.3 million increase for fiscal year 1973 is as follows:

Fiscal year 1972:	*Millions*
Human Resource Program (Race Relations, Human Resources Management and Inter-cultural Relations)	$2.0
Drug Abuse program	3.8
Alcohol Abuse program	.8
Total	6.6

Chairman ELLENDER. Please describe to the committee exactly what the $6.3 million increase for drug abuse, alcohol education and rehabilitation, and race relations will be used for and what you hope to achieve by the expenditure of these funds.

Admiral PLATE. I would like to provide that for the record, Senator.

(The information follows:)

The Human Resource Development Project Office has programs in three broad areas: Human resources, drug abuse, and alcohol abuse. The level of funding for these programs are as follows:

[In millions of dollars]

	Fiscal year—	
	1972	1973
Human resource program	2.0	3.6
Drug abuse program	3.8	8.1
Alcohol abuse program	.8	1.2
Total	6.6	12.9

The Human Resource Program has sub-programs in race relations, command development and inter-cultural relations. The Drug Abuse Program has sub-programs in drug education, central drug rehabilitation, and local drug rehabilitation of members. The Alcohol Abuse Program has sub-programs in central alcohol rehabilitation, and hospital alcohol rehabilitation of members, and training programs.

HUMAN RESOURCE

The Human Resource Program was established to develop and implement on a priority basis an integrated group of programs in the human resource development area. These areas, include race relations, human resources management, and inter-cultural relations.

Principal methodology for dissemination of this program information will be through use of the best available techniques, printed material and audio-visual aide and command development centers. Pre-prepared program packages will be produced and made available for on-board use by the officer in command of individual units. Officer and enlisted personnel already assigned to these units will be trained onboard to effectively utilize program materials so that individual command requirements can be met and to provide onboard continuity. All programs will be continually updated and modernized to ensure that they address contemporary problem areas.

The central theme of programs will be a human resource development type objective of helping individual Navy men to see, respect and understand all other people as individuals with the same basic human rights and desires and to be better equipped to cope with contemporary problems as they relate to the Navy.

Evaluation of implemented programs will be effected utilizing an organization independent from that involved in the design and implementation of the programs.

Human Resource Development Centers are being formed in order to disseminate approved programs and provide for the training of individual units in their use. The Project Office will initially administer and provide for the training of these centers.

The increase in funds in the Human Resource area from 2.0M to 3.6M is caused by the fact that during FY 72 the programs were being researched, initial planning was accomplished, and only a small quantity of actual training was carried out. However, in FY 73 these programs will begin to be distributed in a Navy-Wide basis.

DRUG ABUSE

The Navy has taken steps to combat drug abuse in the areas of education and information, command awareness, recruit screening, law enforcement, identification, detoxification and rehabilitation.

The Navy has a Drug Education Program designed for active duty Naval personnel, their dependents, members of the Naval Reserve Forces, and Navy civilian employees and their dependents. The program combines a range of resources including specialists who are trained in communications and relevent material around the drug issue. These materials are packaged in advanced audio-visual systems. This approach provides the potential drug user with a range of information on which he may make a rational and intelligent decision with an understanding of the probable consequences of that decision for him.

Command awareness is achieved by a series of articles and information packages provided to all Navy command levels.

Most of the people with drug abuse problems in the Navy have these problems prior to their entry into the Navy. Therefore, improved screening techniques at the recruit level were instituted as of late 1971. The basis of this screening is the use of urinalysis testing techniques.

To eliminate illegal drugs from naval vessels and installations, and prevent their introduction aboard these facilities improved enforcement measures aimed at the drug trafficker are being implemented through the Naval Investigative Service. An example is the marijuana dog detection program.

The Navy identifies drug abusers in three ways:

(1) through the Exemption Program, which offers amnesty for voluntary admission of drug use offenses,

(2) urine screening tests,

(3) normal investigative procedures.

Regardless of the identification procedure used, identified drug abusers are given physical examinations by the nearest medical facility. If detoxification (physical withdrawal) is needed, this is accomplished by the nearest capable medical facility.

Most detoxified personnel requiring rehabilitation are sent to a Naval Drug Rehabilitation Center (NDRC). Two NDRCs are in operation; one in Miramar, California and the other in Jacksonville, Florida. Further, local rehabilitation centers (CARE Centers) are being provided world-wide to assist personnel who do not require central rehabilitation.

The large increase in funds in the project was caused by three major factors: (1) full operations of all programs in FY 1973 versus partial operations in FY 72, (2) the advancement of the drug education program from a phased 3 year pro-

gram (FY 72, FY 73, & FY 74) to a phased 2 year program in FY 72 and FY 73, and (3) the increase in the number of central and local rehabilitation centers in FY 73 over FY 72.

ALCOHOL ABUSE PROGRAM

Public Law 92–129, 92nd Congress H.R. 6531 of September 29, 1971 specifically required that treatment and rehabilitation be provided for those members of the Armed Forces suffering from alcoholism. The Navy Alcohol Abuse Control Program provides a required treatment program which can return many affected military personnel to an alcohol-free productive life, and an education program for all Navy personnel. General Accounting Office has done a study on the cost of alcoholism among civilian employees and has recently released a similar study on military personnel. A conservative estimate of 5% incidence of alcoholism would indicate that the Navy has some 30,000 alcoholics on active duty, costing the Navy a minimum of $45 million annually. The Long Beach Alcohol Rehabilitation Clinic, established on a local basis at Long Beach, California in 1967, is currently filled to capacity and there is a waiting list for treatment. Pursuant to the Public Law an Alcohol Rehabilitation Center was opened on 1 January 1972 at Norfolk, Virginia and is at full capacity of 75 patients. Another Alcohol Rehabilitation Center is scheduled to open on 1 September 1972 with a third and a fourth center scheduled in order to accommodate the known increase in Naval personnel who must be treated as a result of improved Navy-wide programs aimed at early identification of alcohol-dependent persons.

Increased funds are required to expand the Navy's alcohol rehabilitation facilities from 2 in FY 72 to 4 in FY 73 and to expand the number of alcohol rehabilitation units in Naval Hospitals from 15 in FY 72 to 38 in FY 73.

DRUG ABUSE PREVENTION AND REHABILITATION PROGRAM

Chairman ELLENDER. On page 1–8 there is an increase of 85 positions in the drug abuse prevention and rehabilitation program. This 85, as I understand it from the footnote, is in addition to 335 positions already being funded. Before I get into the need for the additional 85 positions, however, I think a bit more explanation about the generation of the 263 extra positions over the 72 authorized last year would be appreciated. Would you please explain the footnote on page 1–8 a bit more fully, including where the extra positions came from and at what cost and what they were used for?

Admiral PLATE. The 263 positions for the drug abuse prevention and rehabilitation program were provided by reprograming from other ongoing programs of lesser priority. The cost of these positions is $1,661,000.

These positions are being utilized as follows: Detoxification, treatment, and collection and screening program, 193; Naval Investigative Service, 25; and Drug Rehabilitation Center, 45.

Chairman ELLENDER. With regard to the additional 85 requested for fiscal year 1973, how much funding will be required to support this increase and why are these personnel needed when there are already 335 personnel on board?

Admiral PLATE. Twenty-five positions are required for the Naval Investigative Service, and 60 positions are required for two more Drug Rehabilitation Centers. The cost of these positions is $1,205,000.

CHANGE IN FUNDING SOURCE FOR NAVAL TRAINING DEVICE CENTER

Chairman ELLENDER. With regard to the transfer of the Naval Training Device Center from R.D.T. & E. funding, the third item on the summary, would you please explain what this encompasses?

Captain KENNEDY. Yes, sir. A review of the mission and functions of the Center indicated that it was inappropriately classified as an R.D.T. & E. activity. Although some research and development is being accomplished, the major portion of the effort is procurement, logistic support, and major maintenance which is an O. & M. responsibility.

Senator YOUNG. In making this transfer, are there any new positions being requested other than the ones being transferred, that is, is the authorization being expanded with the move?

Captain KENNEDY. No, sir. There is a minor decrease in fiscal year 1973 compared to fiscal year 1972.

PROJECT VOLUNTEER INCREASES

Senator YOUNG. At the bottom of page 1–8–8 you breakdown the programs within Project Volunteer and indicate the amounts requested in the $32.6 million budget, and at the bottom of that paragraph you indicate the distribution of the increases. The largest item in the total increase is an increase of $8.6 million for recruiting. If my subtraction is correct, this means that in 1972 you only had $7.9 million for this purpose and you want to more than double that in this coming year. I would like you to explain specifically what this increase is for. I would also like you to explain to the committee, in detail, why the increase is needed.

Admiral PLATE. I would like to provide that for the record, Senator. (The information follows:)

The President's move toward a no-draft environment has a singular meaning for Navy recruiting—we are now in direct competition with private industry and the other services for qualified young people. Our budget estimates reflect this competition. Recruiting costs have climbed steadily the past two years because an increased number of contacts must be made for each accession and will not level off in the foreseeable future. The Navy's defense posture is at stake.

A review of our budget planning under Project Volunteer may be in order. The President's plan calls for a zero draft effective July 1973. This permitted two years to prepare. Our planning for FY 1972, the first year, envisioned programs and resources required to gear up our capability to launch a more fully committed effort in FY 1973. Long lead times are required to coordinate an infusion of trained manpower to augment base program capabilities. Experience has changed the condition of Navy recruiting, however. We did not anticipate a no-draft environment last summer, the impact of which has been a shortfall of quota attainments for six months. Nonetheless, our original budget planning was for a reasonable build-up in FY 1972, assuming normalcy in the draft, and significant increases in FY 1973 and a leveling of recruiting augmentations in FY 1974 and FY 1975.

Our recruiting budget for FY 1973, therefore, planned a doubling of our current effort. It reflects a 600% increase in workload, for recruiting is more difficult. Two years ago 50 people were contacted to recruit one. The ratio is now 300 contacts to one recruit. Specifically, the +$8.6 million includes $4.6 million for media, $.6 million for civilian personnel costs, $.7 million to develop a rapid response data system, $1.5 million for leased sedan costs utilizing GSA rates, $.6 million for canvasser support items and $.6 million of out-of-pocket expenses authorized by PL 92–129 for recruiting personnel.

These costs are unavoidable. They are minimal and upward adjustment may be required because of the competitive nature and vital necessity of recruiting. A significant increase in advertisement is requisite if we are to communicate the advantages and programs available in the Navy. Canvassers can no longer rely on walk-ins. They must get out in the free enterprise market. We have programmed a 36% increase in our canvasser force to respond to the increased workload. They must be fully supported. Simultaneously, we must streamline applicant processing and make other improvements which promote the recruiting effort.

SUPPORT OF NAVAL RESERVE

Senator YOUNG. An entirely new item in the project this year is the request for $0.4 million for improved support of the Naval Reserve. Exactly what is this item for? Please be specific and tell us why these funds are being included in the budget and why they are in the budget in this budget activity as opposed to the budget activity funding the Guard and Reserve?

Admiral PLATE. Let me answer your last question first. We included Reserve support in this budget activity instead of in Budget Activity 5 (Guard and Reserve Forces) because we felt that it would be appropriate to present a consolidated Project Volunteer request rather than a fragmented one. The increase of $0.4 million for improved support of the Naval Reserve is comprised of several items which we feel would not only create a more favorable atmosphere for reserve recruiting, but would also provide the potential to improve management by making available more current, valid data than is now being provided. I would like to provide details on the individual programs for the record.

(The information follows:)

1. AUTOMATED RETIREMENT POINT CREDITS

We propose to automate a Reserve enlisted retirement point credit system. The system will have the capability to provide an annual status report of total retirement point credit earned the previous year to inactive reserve personnel. The system will provide for full and accurate compliance with existing law. 10 USC 1331(d) requires that each Naval Reservist completing the years required for eligibility for retired pay (20 years qualifying service) be notified in writing within one year after completing that service.

2. READY RESERVE PERSONNEL SURVEYS

There is a continuing and increasing need for Reserve community personnel survey data as the Navy approaches an All Volunteer Force environment with increased reliance on Reserve Forces. This program would provide for formulation of an opinion questionnaire and to conduct surveys of Naval Reserve members in order to provide valid measurement of Reserve reaction to various Navy actions which impact on the Reserve community.

3. CIVILIAN PERSONNEL SUPPORT

This item would provide civilian personnel required to monitor, analyze, revise, and make recommendations for modifications or additions to the data base or existing Reserve ADP programs at Personnel Accounting Machine Installation (CONUS) at Bainbridge, Maryland. Present Reserve planning capabilities, including analytical and statistical processes, are not responsive to the need.

4. RESERVE ADP SUPPORT

This item provides Reserve planners with additional Reserve ADP support resulting in specific, tailored information based on uniquely modeled or categorized data from the Manpower and Personnel Management Information System (MAPMIS) (inactive). A modified data base supporting the MAPMIS system will interact in such manner as to provide a timely, accurate response relative to the reserve community.

EDUCATION PROGRAMS

Chairman ELLENDER. For "additional emphasis on education programs" you are requesting an additional $1.8 million. I presume that this includes funding for the expansion of the enlisted advanced degree completion program but want to know to what extent. Would you please break down the $1.8 million addition and tell exactly what the increase is for?

Admiral PLATE. We are increasing participation in the enlisted associate degree completion program (ADCOP) by 1,000 students for a dollar increase over fiscal year 1972 of $1,314,000. This is a 2-year college training program at the end of which the student receives either an associate of arts or an associate of science degree. This program has proven itself to be an effective method of improving career retention among Navy's enlisted members. The remaining $436,000 requested is for the Naval Reserve Officer Training Corps program to pay for the full year costs associated with the 500 additional student inputs provided in the fiscal year 1972 request.

Chairman ELLENDER. Would you also please indicate the total amount requested in this budget regarding emphasis on education programs for each of these items that are being increased?

Admiral PLATE. The total request for the ADCOP program in fiscal year 1973, including Project Volunteer, is $2,658,000; for the NROTC program it is $11,892,000.

MEDICAL AND COMMISSARY PERSONNEL

Chairman ELLENDER. There is also an item of increase in this request of $2.5 million for "full-year costs of medical and commissary personnel hired in fiscal year 1972." Would you please explain this item to us? What medical personnel are you referring to and what commissary personnel?

Admiral PLATE. The dollars for commissaries will be used to improve levels of patron service by providing expanded sale hours, reduction of waiting time, increased selection of merchandise, improve management techniques, and, generally, more responsive service. This program is a continuation of the 560 personnel hired in fiscal year 1972 and carried over into fiscal year 1973, resulting in an additional requirement of $2,114,000 over fiscal year 1972.

The medical portion provides for improved medical facilities and services including increased medical personnel efficiency and utilization, reduced waiting time for patients and improved cleanliness and environment. These improvements include 480 man-years started in fiscal year 1972 and continued in fiscal year 1973 with an increased cost of $343,000.

BASE OPERATIONS

Chairman ELLENDER. In the base operations program, there is a decrease in the field operations that is almost entirely offset by increases in the Bureau of Naval Personnel with such increases as first phase of the automated microfile personnel record system; additional ADP equipment; and increases for headquarters support of race relations and drug rehab programs. Taking the microfile personnel record system first, would you please explain this system to the committee; what it is, what it will do, how much it will cost through completion; and what savings will accrue as a result of the adoption of this system?

Admiral PLATE. I would like to provide that for the record, Senator.

(The information follows:)

The Bureau of Naval Personnel currently maintains paper personnel records for 140,000 officers and 620,000 enlisted men. The records are basically unstructured folders containing an average of 85 documents each, ranging up to over

1,500 for flag rank officers. Duplicates, routine material, personal information, and other non-essential data are included. Files occupy 37,000 square feet of floor space and require annual maintenance costs of $1,212,000. Records are used by over 1,500 authorized personnel. While being used, they are not available to other users; duration of such out of file conditions averages 14 days. As many as 50,000 records are out of the central files at any one time. Misplaced records are a recurring problem.

The proposed Microfile Personnel Record System is a means for maintaining the complete set of documents required by the Bureau of Naval Personnel in performing personnel functions for all active and participating inactive naval military personnel. It is a microfilm record of all actions pertaining to a man's naval career designed to solve current record keeping and usage problems. The officer record consists of seven categories of information: Fitness Reports; Professional History; Education and Qualifications; Awards, Medals, and Commendations; Adverse Information; Security Data; and Personal Data. The enlisted man's record consists of three categories of information: Performance Evaluation and Training Data; Professional History; and Personal Data. Each category of information is contained on a single 4 x 6 inch microfiche, which contains space for up to 98 document images. The records are stored in a master file and a satellite file. The master file contains all fiche of all records. Users are provided with copies of those portions of the record they require. The satellite file contains officer fitness reports only, and is located and used in the detailing and placement offices thereby providing highly individualized service to officers in assignment and career planning functions. The proposed system does not need computer augmentation, however, the design specifications will permit such capability to be provided in the event that requirements change in the future.

The system provides for converting the present paper record—sixty-five million documents—into about three million microfiche. It provides for maintenance of the file and for adding required document images to individual records at the rate of 40,000 per day. It structures the personnel record into discrete information categories, making the information therein readily retrievable. Material is reduced by 50–65% in officer records and 20–25% in enlisted records. Duplicates, routine material, outdated material, personal documents are eliminated. Overall utility is greatly enhanced: single records can be ordered and received in 63% less time than at present; information can be readily located; sharper focus can be placed on individual needs and desires; master records are out of file only for the length of time required to update them—less than one day; any number of users can receive duplicates of the same record simultaneously for distribution, research, selection board, correspondence, or other record review purposes; potential loss of records is significantly reduced through a "close-control" system.

A four year conversion process is contemplated; active officers the first year, followed by inactive but participating reserve officers the second year, with the total enlisted file requiring the following two years. Projected total cost for development and conversion is 5.5 million dollars. This includes all of the various appropriations (OPN, O&MN, MPN) for the entire conversion, including purchase of required equipment and supplies.

No savings are currently projected to be accrued in terms of "pay back" dollars. The annual operating cost of the microfile system will be about the same as the current flat paper record system. Anticipated improvements in the "state of the art" in microform technology should provide some reductions in operating costs in future years. An immediate savings of 24,000 square feet of floor space will be realized upon completion of conversion to microfile. Major benefits are intangible. They include better management of the Navy's personnel assets and improved efficiency in the work of personnel who use the service records.

Microfile Program

Chairman Ellender. How much was provided for the microfile program in fiscal year 1972?

Admiral Plate. No funds were provided for the microfile program in fiscal year 1972. However, in order to conduct a pilot program to test and evaluate the new system, $60,000 were reprogramed from

within headquarters funds. As a result, some of the women officer and enlisted personnel records were converted to the new microfile system as a pilot test program.

ADP Equipment Sufficiency

Chairman Ellender. Why do you need more peripheral ADP units? In explaining your need, would you please indicate what equipment you now have on hand in the Bureau of Naval Personnel and why it cannot be used to accommodate this need? Please also indicate the utilization rates of the equipment now on line that would be supplemented by this additional equipment.

Admiral Plate. The IBM 360/65 was installed at Bupers to provide a computer capable of updating all Navy personnel data on a more frequent basis because the monthly update cycle was not timely enough for management purposes. The installation of the IBM 360/65 in Bupers was approved for two phases. As a result of the first phase, the officer and the requirements files have been updated three times a week since the 360/65 was installed. The enlisted system is still on a monthly update on an IBM 7080. The Navy is the only service still limited to a monthly enlisted cycle. This just is not good enough for budget, recruiting, distribution, and management purposes. As the second phase of the system plan, we have completely redesigned and are reprogramming our enlisted system. Major improvements being incorporated include centralized distribution of enlisted personnel, tying the Navy personnel and pay systems together in the joint uniform military pay system, better control of personnel in training, and better control in the transients, patients, and prisoners area. All of these programs are proceeding satisfactorily but we must have the computer capability to update the enlisted files daily to support our management requirements. The addition of these previously planned peripherals will provide this capability and permit release of the obsolescent IBM 7080 computer by the end of fiscal year 1973. The 360/65 is presently being used in excess of 500 hours per month, three shifts per day, 5 days per week. The addition of the required peripherals will provide sufficient capacity to handle the daily enlisted update by operating three shifts, 7 days a week.

Race Relations and Drug Rehabilitation

Chairman Ellender. The last increase in this base operations area that I wish to question you about is the race relations and the drug rehabilitation increases. Would you please indicate to the committee how much is already budgeted in these two areas aside from the increase?

Admiral Plate. There is $183,000 in the budget for Headquarters support in the race relations and drug rehabilitation program.

Chairman Ellender. Exactly what will the increase in the drug abuse and race relations areas be used for?

Admiral Plate. The increase is for clerical support of these programs.

Medical Support Program

Chairman Ellender. In regard to the medical support program, there is one further question that I have concerning the difference between the original 1972 request and the revised 1972 estimate. It concerns the number of naval hospitals and medical centers. Last year you indicated that there would be 37 hospitals and three medical centers operated by the Navy in fiscal year 1972, but this year you indicated that 38 hospitals and four medical centers are in operation. Would you please explain this difference and tell us where these additional facilities are located?

Admiral Davis. Yes, sir. First we established the Navy Regional Medical Center at Portsmouth, Va. This center encompasses all medical treatment facilities, except the operating forces, in the Tidewater area under one single command. Second, we have established a Naval hospital at Roosevelt Roads, P.R. This action incorporated the mission of the dispensary at Roosevelt Roads and the remaining missions of Rodriquez Army Hospital when that activity was closed.

Hospital Operations

Chairman Ellender. Looking over the workload figures on page 1–8–11, and comparing 1972 to 1973, I have a difficult time seeing the need for the additional $6.2 million that you are requesting for hospital operations. The inpatient load is decreasing, while the outpatient care and services does not appear to be increasing that much, certainly not the 5 percent that the budget is requesting. Would you please explain why such a large increase is needed in hospital care when the amount of inpatient care is decreasing and the outpatient care and services are relatively unchanged from fiscal year 1972?

Admiral Davis. Of the $6.2 million increase in hospital operations, $2.1 million is for the expansion of the drug abuse program in the area of testing and detoxification, $0.5 million is for expansion of the clinical investigation program, $2.8 million is for approved pay increases, both classified and wage board, and $0.7 million for increased cost of maintaining and operating our physical plant facilities. Changes in workload have little effect on these programs.

Plastic Lens Program

Senator Young. On page 1–8–13, you indicated an increase of $500,000 in other medical support for the second phase of the ophthalmic plastic lens program as directed by the Federal Drug Administration. Would you please explain the program to the committee?

Admiral Davis. The Federal Drug Administration directed that all eyeglasses must have either plastic or hardened glass lenses by December 31, 1971. Because of the superiority of plastic over hardened glass lenses the Navy chose to utilize plastic lenses to the extent possible. We will soon complete a new plastic lens fabrication facility, and we will complete our change to plastic lenses. The increase is to provide an initial stock of lenses and provide for the increased price per unit.

OTHER INCREASES

Senator YOUNG. Also on page 1–8–13, you indicate an increase for the Bureau of Medicine and Surgery of a little over $200,000, which you say is due to the pay increase and increased emphasis on improved health care delivery systems. Would you please explain the health care delivery systems increase, indicating exactly how much is requested for this purpose, whether additional personnel are involved, how much is already in the budget for this purpose, what you hope to achieve by this increased emphasis and, of course, why this increased emphasis is necessary?

Admiral DAVIS. We are requesting $0.1 million and four civilians to provide increased emphasis on our health care delivery systems and we have not budgeted funds for this purpose in fiscal year 1972. What we hope to achieve is an increasing emphasis on making our health care delivery systems more responsive to our clients' needs. Some of the changes could be extension of hours, preventive health emphasis, regionalization for more effective use of health professionals, and rapid response to customers complaints.

BUDGET ACTIVITY 9—ADMINISTRATION AND ASSOCIATED ACTIVITIES

Admiral MINTER. This budget activity funds a wide range of services and fleet support functions provided by Navy-wide finance activities. These functions include provision of central, regional and local disbursing services; payment of dealers' bills, Government bills of lading and transportation requests; performance of fleet, central and field accounting; examination and consolidation of disbursing and stores returns; and payment of military and civilian personnel. Also included in this activity are services provided by the Naval Audit Service, the regional offices of Civilian Manpower Management and numerous other specialized and general support activities. In addition, support is furnished to the Secretary of the Navy and his departmental staff offices and to the Office of the Chief of Naval Operations. Budget Activity 9 also includes funds for official mail, maintenance and operation of the Naval Petroleum Reserve and audiovisual and public affairs activities.

CIVILIAN EMPLOYEES

Chairman ELLENDER. Do you have many civilians so employed?

Admiral MINTER. Yes, sir, in the administrative area.

Chairman ELLENDER. In this activity?

Admiral MINTER. I can give you figures on the total number of civilians that are in this area.

Chairman ELLENDER. Does that pay for administration overseas or only in this country?

Admiral MINTER. No, sir, I don't think there is any overseas costs involved in this.

Captain ABERCROMBIE. I am Captain Abercrombie, Office of Chief, Naval Operations.

In this area we do not have any overseas activities which the Navy supports.

NONSUPPORT OF NATO ACTIVITIES

Chairman ELLENDER. Are any of these funds used to support any NATO activity?

Admiral MINTER. No, sir. No NATO activities listed here.

Chairman ELLENDER. Is any of this utilized for activities in the Mediterranean?

Admiral MINTER. No, sir. We have a list of headquarters this applies to, Mr. Chairman, and it is not the 6th Fleet, for example. We are not talking about the 6th Fleet.

The 6th Fleet is not one of the headquarters to which these civilian personnel are attached.

Chairman ELLENDER. I noticed when I was there 2 years ago a great deal of administration activity.

Admiral MINTER. Yes, sir; but not in the 6th Fleet.

Chairman ELLENDER. At Naples?

Admiral MINTER. At Naples there are a number of commands. There is a NATO command. But I thought you were talking about the 6th Fleet itself.

Chairman ELLENDER. I referred to the administrative field, because that is what this covers.

Admiral MINTER. These personnel are not identified as administrative.

Chairman ELLENDER. Would personnel you have in Naples be included?

Admiral MINTER. No, sir.

OPERATIONAL COMMAND AND ADMINISTRATIVE COMMAND

Chairman ELLENDER. Why have you not separated these activities?

Admiral MINTER. I think the comment was just made, the split between the operational command and the administrative command is how this is broken down in the budget activities.

By operational command, I am talking about the fleet commanders themselves, like the 6th Fleet you referred to a moment ago. He does not have this type of administrative overhead costs charged against him.

INCLUSION OF ADMINISTRATION COSTS IN BUDGET ACTIVITIES

Chairman ELLENDER. Please provide the reasons administration costs are not included in one place.

Admiral MINTER. I will provide that for the record.

(The information follows:)

The budget activities of the Operations and Maintenance, Navy appropriation are structured by the classification of the Department of Defense Five Year Program. This classification differentiates between the major mission responsibilities of the Department and each Military Service, e.g., Strategic Forces, General Purpose Forces, Intelligence and Communications, etc. Recognizing that any organization has certain elements which are primarily administrative vice operational in nature, one of the Five Year Defense Program's categorizations is Administration and Associated Activities (Budget Activity 9 in the O&M appropriations). In this Program/Budget activity resources are identified and requested for organizational elements which are administrative in the primary functions and mission.

Budget Activity 9 of the O&MN appropriation adheres to the classification discussed above and includes resources for the Office of the Secretary of the Navy, the Secretariat Staff (including responsibilities in the field), the Office of the Chief of Naval Operations and other field activities which perform administrative functions (such as Naval Districts and Naval Bases with their principal responsibilities of area coordination). Headquarters commands and staffs which are operationally oriented toward one of other mission categories of the Navy are identified with the appropriate budget activity. Thus the staff of a fleet commander is included in Budget Activity 2–General Purpose Forces; and the staff of the Chief of Material is included in Budget Activity 7–Central Supply and Maintenance. The budget submission also includes a Special Analysis of all these headquarters activities regardless of budget activity placement.

Distribution Costs

Captain Brock. To give you an idea of the distribution costs in the particular budget activity of the total; of $173 million requested, only $31.4 million is requested for departmental administration; that is, at the headquarters area here in Washington.

Chairman Ellender. This does not include the salaries of military personnel, does it?

Captain Brock. No, sir; it does not. Of 9,400 civilian personnel budgeted for in this activity, only 1,500 are associated—just about 1,500 are associated with SecNav and the CNO. A large part of this operation is a field operation even though it is budgeted as administration in this particular budget.

NATO Activities

Chairman Ellender. The offices you have in London do not service any of the NATO activities, do they?

I am trying to separate, if I can, not only operations, but also the moneys that may be used to administer NATO operation, because, as I understand it, that is kept as a separate operation; is it not?

Admiral Minter. Yes, sir. You spoke about London and this gets a little involved because the headquarters in London is not a NATO headquarters but it does have interface with NATO forces.

Chairman Ellender. What I want to try to find out before I get through with these hearings is how much are we spending for NATO operations.

Admiral Minter. I think we can break out those costs for you, particularly in this area.

Chairman Ellender. I assume the Army is the largest contributor.

Admiral Minter. They have several divisions there.

Chairman Ellender. I presume I will be able to get the information from the Army. Anyhow, you understand what is desired.

Admiral Minter. Yes, sir.

1972 Appropriation and 1973 Budget Request

The fiscal year 1973 request for this budget activity is $173.8 million, a net decrease of $3.1 million from the fiscal year 1972 level. This decrease reflects the net effect of: (1) the transfer of $5.7 million funding for NATO facilities to the General Purpose Forces budget activity; (2) the transfer of $14.6 million of Employees' Compensation funding to the Central Supply and Maintenance Budget activity; (3) increased reimbursement to the U.S. Postal Service for official mail of

$14 million; a full year's cost of the graded civilian pay raise of $2.6 million; (4) reductions in civilian employment compensation and support costs of $3.5 million; and certain specific program increases requested in the servicewide support area of $4.1 million. These program increases are for overhaul of the USS *Constitution* in preparation for the Bicentennial, starting an environmental cleanup program at Naval Petroleum Reserve No. 4 in Alaska, increased requirements for the Joint Uniform Military Pay System, and direct funding of the Marine Corps share of the costs of Naval Disability Evaluation.

Navy Secretariat

Chairman Ellender. Using the revised 1972 estimate as the basis for comparison, as given in the justification, there is very little change in the departmental administration request, only a $72,000 decrease from a total request of $31.4 million. Within that request, however, regarding the Navy Secretariat, you indicate that the funding requested will provide for 683 man-years of civilian employment, a reduction of 19 from 1972. This you say "provides the minimum staff necessary to fulfill the mission of the Navy Secretariat". Would you please outline for the committee what that mission is?

Mr. Yannella. The Secretary of the Navy is the head of the Department of the Navy. Under the direction, authority and control of the Secretary of Defense, he is responsible for the policies and control of the Department of the Navy, including its organization, administration, operation, and efficiency. The Secretary of the Navy is assisted by the civilian executive assistants who are the Under Secretary and the Assistant Secretaries. It is the policy of the Secretary to assign departmentwide responsibilities for areas which are essential to the efficient administration of the Department of the Navy to and among the civilian executive assistants and to the staff offices assigned to them for administrative purposes. Such areas will include, but are not limited to, manpower, material, facilities, research and development, financial management, and military and business legal services.

Chairman Ellender. I would also like to know if the reductions you have made in civilian personnel have been offset by additional military personnel so will you please provide for the committee a table showing the total personnel strength, on the man-year basis, for the Navy Secretariat. Please break this down for fiscal years 1972 and 1973 and military and civilian man-years.

Mr. Yannella. I will be glad to do so.

(The information follows:)

	Fiscal year 1972 estimate	Fiscal year 1973 estimate
Military man-years	301	300
Civilian man-years	702	683

Civilian Personnel

Chairman Ellender. Would you also please provide the committee with a breakdown by grade of the total number of military and civilian personnel that this request for the Navy Secretariat will support. I realize that the military personnel will be paid out of the

Military Personnel appropriation but I would like to have this breakdown anyway.

Mr. YANNELLA. The request to which you refer will support 969 civilian end strength and 683 man-years, a reduction of 18 end strength and 19 man-years below fiscal year 1972. The approved military allowances for fiscal year 1972 and fiscal year 1973 total 301 and 300, respectively. The information by grade/rank or rating I will provide for the record.

(The information follows:)

	Fiscal year 1972 estimate	Fiscal year 1973 estimate
Civilian personnel by grade:		
Executive level II	1	1
Executive level IV	5	5
Executive level V	1	1
10 U.S.C. 1581 (professional and scientific)	5	5
GS–18	5	5
GS–17	7	7
GS–16	17	17
GS–15	92	89
GS–14	75	73
GS–13	82	80
GS–12	45	43
GS–11	28	26
GS–10	8	8
GS–9	60	58
GS–8	32	31
GS–7	65	64
GS–6	61	60
GS–5	49	48
GS–4	41	40
GS–3	27	27
GS–2	4	4
GS–1		
Ungraded	4	4
Total civilian	714	696
Military personnel by rank:		
Officer:		
Admirals/generals	10	10
Captains/colonels	69	69
Commanders/Lieutenant Colonels	76	75
Lieutenant commanders/ majors	43	43
Lieutenants/Captains	19	19
Lieutenant junior grade/1st lieutenants	5	5
Ensigns/2d lieutenants		
Total officers	222	221
Enlisted:		
Master chief petty officers (E–9)	4	4
Senior chief petty officers (E–8)	2	2
Chief petty officers (E–7)	18	18
Petty officer 1st class (E–6)	28	28
Petty officer 2d class (E–5)	16	16
Petty officer 3d class (E–4)	9	9
Seamen (E–3)	2	2
Apprentices (E–2)		
Recruits (E–1)		
Total enlisted	79	79
Total officer and enlisted	301	300

OFFICE OF CHIEF OF NAVAL OPERATIONS

Chairman ELLENDER. I see that the situation in the Office of the Chief of Naval Operations is somewhat similar to the Navy Secretariat. Would you please furnish a comparative breakdown of military and civilian personnel in this activity for fiscal year 1972 and 1973 as you did with the Navy Secretariat?

Captain ABERCROMBIE. I will be glad to do so.
(The information follows:)

	Fiscal year 1972 estimate	Fiscal year 1973 estimate
Military end strength	1,214	1,202
Civilian end strength	893	881

CNO PERSONNEL BY GRADES

Chairman ELLENDER. Would you also provide the committee with a breakdown by grade of the total number of military and civilian personnel that this request for the Office of the Chief of Naval Operations will support?

Captain ABERCROMBIE. I will be glad to do so. The information will be provided by end-strength according to grade/rank or rating.

(The information follows:)

	Fiscal year 1972 O. & M., N supoort OPNAV	Fiscal year 1973 O. & M., N support OPNAV
Civilians by grade:		
GS-2	14	14
GS-3	10	10
GS-4	48	48
GS-5	136	135
GS-6	125	124
GS-7	106	106
GS-8	23	23
GS-9	64	62
GS-10	2	2
GS-11	56	55
GS-12	49	47
GS-13	59	56
GS-14	69	68
GS-15	90	89
GS-16	13	13
GS-17	4	4
GS-18		
U.S.C. 1581	12	12
Ungraded	13	13
Total civilians	893	8 8

Military personnel by rank	Fiscal year 1972 MPN OPNAV	Fiscal year 1973 MPN OPNAV
Officer:		
Admirals	62	62
Captains	291	288
Commanders	337	339
Lieutenant commanders	142	144
Lieutenants	40	40
Lieutenant junior grade	6	6
Warrant officers	4	4
Total officers	882	883
Enlisted:		
Master chief petty officers (E-9)	7	7
Senior chief petty officers (E-8)	11	11
Chief petty officers (E-7)	70	70
Petty officer 1st class (E-6)	122	116
Petty officer 2d class (E-5)	78	74
Petty officer 3d class (E-4)	25	22
Seaman (E-3)	19	19
Total enlisted	332	319
Total officers and enlisted	1,214	1,202

Field Headquarters

Senator Young. On page 1–9–4, you indicate that the funding of the Field Headquarters and Activities budget program is being reduced by over $7 million, $5.7 million of which is merely transferred to Budget Activity 2, General Purpose Forces. For reference sake, just where in budget activity 2 was this item transferred and what is the reason for it?

Captain Boykin. These resources, for the U.S. Navy share of NATO facilities operating costs, were transferred to Budget Activity 2—General Purpose Forces, Budget Program C–Base Operations Station Operations (as discussed on page 1–2–7 of the Justification Book). The operating costs of NATO facilities are believed to most properly reflect the General Purpose Forces mission of the Department of Defense through these payments in support of the NATO infrastructure. It was felt that the previous identification of these resources in Budget Activity 9—Administration and Associated Activities tended to distort the categorization of budget activities and the use to which these funds were put.

CNO Personnel in Field Activities

Chairman Ellender. A reduction of $1.6 million is reflected in the Office of the Chief of Naval Operations Field Activities request. Would you please explain to the committee what the scope of these activities is, where the field offices are located, how they are staffed (including the number of civilian and military personnel at each) and essentially, what their purpose is? In sum, would you please outline what these field activities are?

Captain Abercrombie. The reduction of $1.6 million reflected in the Office of the Chief of Naval Operations Field Activities is applicable to the areas in the table I will provide for the record.

(The information follows:)

Activity and location	Fiscal year 1972		Fiscal year 1973	
	Civilian personnel end strength	Military personnel end strength	Civilian personnel end strength	Military personnel end strength
COM 1, Boston	55	41	53	54
COM 3, New York	71	61	70	63
COM 4, Philadelphia	40	41	38	44
COM 5, Norfolk	67	76	64	81
COM 6, Charleston	72	57	67	62
COM 8, New Orleans	43	43	40	45
COM 9, Great Lakes	92	71	87	69
COM 10, San Juan	17	37	15	38
COM 11, San Diego	62	81	58	102
COM 12, San Francisco	48	63	47	72
COM 13, Seattle	43	49	43	49
COM 14, Hawaii	77	69	74	103
COM 15, Canal Zone	24	93	22	90
COM NAVDISTWASH, District of Columbia	33	44	33	44
MAS BRUSSELS, Belgium	3			
NAVBASE NEWPORT, Rhode Island	25	26	25	38
NAVBASE KEY WEST, Florida	7	8	7	14
NAVBASE LOS ANGELES, California	10	23	10	35
NAVSTA WASHINGTON, District of Columbia	898	597	857	597
NAF ANDREWS, District of Columbia/Maryland	120	869	113	836
STRATANALSUPPGR, Maryland	3	14		14
NAVATACDOCACT, District of Columbia	18	13	18	13
NAVSAFECEN, Norfolk	212	179	200	179
	2,040	2,555	1,941	2,642

Naval district commandants: Exercise command of assigned naval shore (field) activities: exercise area coordination over all shore (field) activities in the naval district; represent the Secretary of the Navy, the Chief of Naval Operations, and the offices, commands, and bureaus of the Navy Department in such matters as may be assigned; execute responsibilities with respect to specified functions as assigned by the appropriate Sea Frontier Commander and the Commander Naval Reserve Training Command; administer the Naval Reserve Program (other than air) as assigned; and coordinate public affair matters throughout the naval district.

Naval bases: Command assigned naval shore (field) activities, coordinate the provision of logistic support to fleet units and other naval activities, and carry out area coordination responsibilities over designated shore (field) activities.

MAS Brussels: The Military Agency for Standardization, Brussels is an agency of the Standing Group and is the main standardization agency in the North Atlantic Treaty Organization. Its overall purpose is to contribute to the efficiency of the NATO forces by fostering useful standardization of military procedures, weapons and equipment.

NAVSTA Washington: Provides personnel support functions for permanent and transient naval personnel in the Washington, D.C. area and logistic support and other services as directed and assigned.

NAF Andrews: Provides services and material to support Department of the Navy Administrative Flight Operations; Combat Readiness Training for active duty naval aviators and flight officers assigned duty in the Naval District, Washington, D.C.; Naval and Marine Air Reserve training program; tenant commands; and performs such other functions and tasks as directed by higher authority.

STRATANALSUPPGR: Assists the Deputy Chief of Naval Operations (Plans and Policy) in war game analysis of planned naval operations.

NAVTACDOCACT: Develops, maintains, and produces Navy Manuals on tactics, doctrine, and operating procedures.

SAFECEN: Collects and evaluates information pertaining to safety, publishes statistical data concerning accidents, maintains a repository for accident and safety reports, maintains direct liaison with all levels of command within the Navy and other government and private agencies engaged in safety work and other aspects of the Department of the Navy Safety Program in order to advise and assist the Chief of Naval Operations in promoting and monitoring safety and the prevention of accidents; initiates and conducts informal investigations into all phases of safety to develop information to make recommendations for the formulation of safety policy necessary to maintain the highest practical level of combat readiness.

JUMPS PROGRAM

Chairman ELLENDER. How much funding for the development and implementation of the JUMPS system do you estimate will be required before the system is on line?

Captain BAIRD. Navy JUMPS is being implemented on a modular or segmental basis. The Navy Finance Center, Cleveland, is currently operating two pay systems—portions of the old pay system not yet replaced by JUMPS and segments of the JUMPS system. As a JUMPS module is implemented, personnel involved in that portion of the replaced system are transferred to JUMPS. Accordingly, the increase in JUMPS personnel includes both developmental and operational personnel. Almost 50 percent of this increase will come from personnel transferred from the old NFC function and the balance will come from new hires. Until final implementation on July 1, 1974, resources in the amount of 698 positions and a total budget of $7.6 million in fiscal year 1973 and 668 positions with a total budget of $8.3 million in fiscal year 1974, representing a total dollar outlay of $15.9 million, will be required to complete the development and implementation. It is interesting to note that at the end of fiscal year 1975, when JUMPS has been fully operational for a period of 1 year, the total Navy Finance Center, Cleveland, ceiling will amount to 1,233 positions as opposed

to the 970 position ceiling before JUMPS development commenced. Therefore, the total net additional personnel requirements for Navy JUMPS at the central site (excluding those transferred from within the Navy Finance Center) will amount to only 263 positions.

Chairman ELLENDER. Have you any estimate of what staffing and cost will be required to maintain the system once it is on line? Please provide this for the committee and explain how you derived those estimates.

Captain BAIRD. Navy JUMPS will be fully operational on July 1, 1974. Peak staffing, however, will be realized in fiscal year 1973 with 698 personnel and a total budget of $7.6 million. The staffing in fiscal year 1974 will be reduced by 30 positions to 668 personnel with a total budget of $8.3 million. It should be noted that although the personnel requirement is reduced, the total budget grows by $0.7 million because of increased rental/maintenance costs associated with additional ADP equipment which is required. During fiscal year 1975, the first full year of JUMPS being "on line," the personnel requirement will be further reduced by another 20 positions to 648 personnel with a total budget of $8.3 million. The drawdown of 50 positions during fiscal years 1974-75 has been estimated based on an indepth analysis of the functions and procedural requirements at the Navy Finance Center, Cleveland, associated with the administration of the current pay system vis a vis JUMPS. As the current military pay system is phased into JUMPS, certain functions of the current pay system will be eliminated and/or automated, therefore permitting a reduction in personnel. In fiscal years subsequent to 1975, a further personnel reduction may be realized as the system is executed and refined.

ALASKAN ENVIRONMENTAL PROGRAM

Chairman ELLENDER. The second increase I would like to take up in the Secretariat servicewide support is the $900,000 increase for the environmental cleanup program in Alaska. On page 1–9–11, you indicate that this is the first-year request of a 5-year program of "gathering and disposing of debris . . . that has accumulated . . ." over the years. You also indicate that there is $1.2 million requested in the military construction appropriation for an incinerator at Point Barrow to incinerate this debris. Would you please explain what is the reason for this program? Is there that much garbage in the Naval petroleum reserve up there to justify such a program?

Captain SMITH. The $900,000 requested for fiscal year 1973 is for the first year's environmental cleanup work in the Point Barrow area. Here, approximately 50,000 steel drums, some empty and some full of waste material, will be gathered, crushed, and disposed of in an approved sanitary landfill. In addition, there are approximately 3,600 tons of junk vehicles and equipment to be collected and staged for backhaul.

The incinerator is a joint Navy-Interior project under the auspices of the Environmental Protection Agency to provide a waste disposal system for both the Federal activities in the Barrow area and the village of Barrow. It will incinerate both solid and liquid waste, and will be designed to handle the day-to-day waste generation in the Barrow area.

Senator YOUNG. If, as you say on page 1–9–11 the junk et cetera that is in the area was partially contributed by outside contractors who were in the area, is there any action being undertaken to obtain reimbursement from them for any of the expense that you are going to in this program?

Captain SMITH. Virtually all of the debris involved in the cleanup program was contributed by contractors of various Federal agencies as well as the agencies themselves, rather than by outside contractors. Clean up of the debris generated by the natives in the community of Barrow is being financed and conducted by the Department of the Interior.

Senator YOUNG. If this is a 5-year program, would you please provide the committee with an estimate of the overall cost of this program and a description of what it will entail?

Captain SMITH. The estimated overall cost of the 5-year environmental cleanup program in Naval Petroleum Reserve No. 4 is $3.8 million, excluding the cost of the incinerator at the Point Barrow Camp, which has no relationship to the cleanup program. The breakdown in estimated money and time frame for the total cleanup of the Reserve is as follows: Point Barrow area (1st and 2d year) $1.2 million; Umiat Camp area (2d year) $0.4 million; and outlying drill and seismic sites (2d through 5th year) $2.2 million.

The debris at all of the above areas consists of steel drums, junk vehicles and equipment, and other construction materials that have accumulated during Navy's exploration program in the Reserve from 1944 to 1953 and later by Air Force contractors who constructed the DEW line and operated the Point Barrow Camp, and by contractors of other Federal agencies in the Barrow area. The bulk of the debris consists of steel drums used to import fuel into the area.

Cleanup in the Point Barrow area was described earlier. The work will be performed by contract and it is estimated that 40 men will be employed for the Barrow work. Specialized heavy equipment will be utilized for this project.

Cleanup in the Umiat Camp area will entail the collection, crushing and disposal of about 20,000 steel drums and miscellaneous metal junk. Heavy equipment and labor crews will be required for a full summer season to effect the Umiat cleanup.

Cleanup at outlying drill and seismic sites will entail the collection and disposal of debris at a minimum of 18 widely distributed sites within the confines of the 37,000 square miles of Naval Petroleum Reserve No. 4. This segment of the cleanup program will require the transportation of crews and heavy equipment to each of the sites.

The spread of this work over a 5-year period is due to seasonal restrictions on field work.

POSTAL REIMBURSEMENT

Chairman ELLENDER. The third item in the Secretariat servicewide support area I want to ask you about is the reimbursement for Postal Service. As I recall, there was quite a large increase in the funds for postal fees for all the services in 1972, but I believe that the Navy is the only one that I have seen with a large request for this purpose this year. Would you please explain the need for this increase this year?

Mr. YANNELLA. The fiscal year 1973 request is calculated on the basis of revised rates promulgated by the U.S. Postal Service in May 1971. The new rates reflect an increase of 33⅓ percent in the cost of transporting envelopes. The rates for packages increased even more drastically. Under the previous price structure, a rate of $1 for surface and $4.50 for air mail applied to all packages irrespective of size or weight. Under the present schedule, there are three rates for packages. Depending on size and weight, a package may cost as much as $4 for surface and $14 for air mail. In addition to the rate changes, a uniformed material movement and issue priority system has been established. This system assigns categories of priority mail movements based on the urgency of need. High-speed transportation is specified for high-priority requirements, In order to meet the deadlines established, it is necessary to move a greater portion of material by air. For example, material without which an activity is unable to perform its mission is permitted only three days in transit from the transportation officer to the requisitioning installation or the port of embarkation.

OVERHAUL OF USS "CONSTITUTION"

Senator YOUNG. In regard to the servicewide support provided by the Office of the Chief of Naval Operations, I see on page 1–9–12 of the justification that, included in the net increase of $1 million over the revised 1972 estimate, there is an increase of $1.6 million for the overhaul of the USS *Constitution*. Would you please indicate why an overhaul is necessary? Also, would you please explain why the request for funding the overhaul of the USS *Constitution* is in this portion of the justification?

Capt. ABERCROMBIE. This USS *Constitution* is "Old Ironsides". It actually falls in the service craft category, and therefore is maintained by the local Commandant; in this case, Commandant, First Naval District, and so falls in this program. This will be the first complete overhaul since the 1928–32 era. The ship's hull is in poor condition. The Inspector General has recommended this overhaul now. It must also be readied for the Bicentennial. The overhaul period will run 18 to 20 months and is estimated to cost a total of $4,300,000.

BUDGET ACTIVITY 10—SUPPORT OF OTHER NATIONS

Admiral MINTER. This budget activity provides funds for the support of allies; contributions and support of international military headquarters; and support of military assistance advisory groups, missions, and military assistance groups.

1972 APPROPRIATION AND 1973 BUDGET REQUEST

The fiscal year 1973 request for this budget activity is $58.7 million, a decrease of $15.1 million from the fiscal year 1972 level. Of this decrease, $14.5 million is associated with the support of allies program and $.6 million with the support of MAAG's, missions, and military assistance groups.

Chairman ELLENDER. Are these countries all over the world, or are they in any particular area?

Admiral MINTER. They are literally all over the world. We have allies all over the world, and we do participate, the Navy, in a number of these MAAG's and missions in various parts of the world, in the Mediterranean as well as the Pacific.

We have a list here of MAAG's and missions in Thailand, Korea, Philippines, and the Republic of China that the Navy supports.

Chairman ELLENDER. These MAAG's are not composed totally of Navy people.

Admiral MINTER. No, sir; these are joint headquarters in which the Navy has representation.

Mr. Chairman, this concludes my prepared statement.

VIETNAM SUPPORT

Chairman ELLENDER. The overall program in this field is being reduced in 1973 from $73.8 million to $58.7 million. Would you care to make any further comments on this aside from what you have already said? If you do we would be glad to hear from you.

Captain BOYKIN. As noted in the justification book, the decreased requirements in this area are principally related to the disestablishment of the Naval Support Activity Saigon during fiscal year 1972.

VIETNAM NAVAL SUPPORT

Chairman ELLENDER. In the support of allies program, the greatest decrease is in Naval Support Activity Saigon, which is eliminated completely. Would you tell the committee what the effect of this will be? Will we no longer have naval support in Saigon or are there arrangements where the Vietnamese will support us or what?

Captain BOYKIN. A few of the administration and personnel functions of the Naval Support Activity Saigon, will be assumed by the Commander, Naval Forces Vietnam in the early part of fiscal year 1973. [Deleted.]

The primary function of Naval Support Activity Saigon has been to support U.S. Naval operations in Vietnam. The withdrawal of remaining United States Navy operating forces, which has occurred in conjunction with our Vietnamization efforts, has permitted the disestablishment of this supporting organization.

SUPPORT FOR THAI NAVY

Chairman ELLENDER. Another item that is being eliminated completely is the Material Assistance to the Royal Thai Navy. You indicate, however, that the funding for this purpose is merely being transferred. Would you please tell the committee why this transfer was made and whether the assistance now afforded the Thai Navy is comparable to that furnished before the transfer?

Captain BOYKIN. The transfer of funding for the Royal Thai Navy to the military assistance appropriation was directed by section 513 of the Foreign Assistance Act of 1971 to commence July 1, 1972. A comparable amount of assistance previously anticipated to be service funded has been requested under the foreign assistance appropriation in fiscal year 1973.

Vietnam Naval Support

Chairman Ellender. Turning back to pages 1–10–2 and 3 and the military assistance service funded program-Vietnam, I see that an increase of $1.4 million is requested for this activity. I wish you would explain the major items of increase in that total. Please explain specifically why the increases are needed in the areas of boat/service craft support, for which an additional $600,000 is requested; overhauls in Vietnam, for which $900,000 additional is requested; and base maintenance material and equipment, for which an additional $1.1 million is requested?

Captain Boykin. An additional $637,000 is requested for boat and service craft support. The U.S. Navy funds the material support of these Vietnamese Navy boats and craft. As Vietnamization progresses, the inventory of the Vietnamese Navy is increasing, thus increasing the requirement for material support funds.

The Vietnamization program is endeavoring to improve the capability of the Vietnamese Navy in ship repair and maintenance toward the goal of self-sufficiency within Vietnam. For overhauls in Vietnam, the U.S. Navy funds only material costs. As the logistic support bases are outfitted with synchro lift equipment and their work force (together with that at the Vietnamese Navy Shipyard) increases their technical knowledge and experience levels, more ships/boats/service craft are capable of being overhauled in country. In fiscal year 1973 it is planned to conduct 68 such overhauls in-country vice 39 in fiscal year 1972.

In the area of base maintenance material and equipment, the increase of $1,114,000 is associated with the continuing turnover of various types of advance bases. [Deleted.]

In fiscal year 1973, the requested funds will provide for base maintenance, such as spare parts, supplies, commercial power, and compressed gases for these bases. These requirements are increasing as the number of bases increases.

MAAG Missions

Chairman Ellender. With regard to the MAAG's, missions and military assistance groups, I see that the request is down from $2.4 million in 1972 to $1.8 million in 1973. On page 1–10–5, you indicate that this is due to the transfer of certain field units to the Departments of the Army and Air Force. Would you please identify these elements that are being transferred and indicate how much was budgeted for each in fiscal year 1972?

Captain Abercrombie. These are field elements to support the mission of the Deputy Chief, Joint U.S. Military Advisory Group, Thailand. The amounts of funds transferred was $434,000 to Department of Army and $277,000 to Department of the Air Force.

Chairman Ellender. Would you also please provide for the record a list of all of those advisory groups in the Pacific and Europeon areas for which these funds are requested and the amount estimated for 1972 and requested for 1973 for each?

Captain Abercrombie. I will provide that information for the record, Mr. Chairman.

(The information follows:)

[In thousands]

Activity	Fiscal year 1972 estimate	Fiscal year 1973 request
Chief, Joint U.S. Military Advisory Group Philippines	$34	$34
Chief, Military Assistance Advisory Group China	73	68
Chief, Joint U.S. Military Advisory Group Korea	409	401
Deputy Chief, Joint U.S. Military Advisory Group Thailand	1,846	1,128
Latin American Cooperation	51	61
Navy Support of MAAGS/Missions (Europe)	5	5
ODR's India/Pakistan	0	76
Total	2,418	1,773

OSD Budget Reduction

Chairman Ellender. I have three further requests for information that you most likely will have to furnish for the record. To begin with, I would like to know how much the budget request that you generated within your service was reduced by the Office of the Secretary of Defense and where these reductions were made. I want to know the specific programs that were reduced and by what amount. Also, please indicate exactly what the additional requests were for.

Admiral Minter. Yes, sir; I will provide that for the record.

(The information follows:)

OPERATION AND MAINTENANCE, NAVY—FISCAL YEAR 1973 BUDGET

ANALYSIS OF BUDGET ACTIVITY OF OSD BUDGET CHANGES TO FISCAL YEAR 1973 PROGRAM

[In millions of dollars]

	Fiscal year 1972 column of fiscal year 1973 budget	Fiscal year 1973 navy request	Fiscal year 1973 OSD allowance	Fiscal year 1973 OSD adjustment
Budget activity 1, strategic forces	277.8	305.2	305.2	
SSPO operation support: Miscellaneous reductions to FBM operation support program managed by SSPO, and preparatory costs incident to installation of the Poseidon training system				−9.0
Ship operations: Shipboard repair parts and OPTARS; also T-AK resupply ship charter costs				−5.4
SSBN overhaul: Adjustment due to deferral of SSBN-602 (Abraham Lincoln) overhaul from fiscal year 1972-73				+16.2
ULMS program				+3.0
Miscellaneous adjustments: Primarily average man-year costs, and cost escalation reductions				−4.8
Budget activity 2, general purpose forces	1,656.6	1,787.6	1,611.7	−175.9
Aircraft forces: Operate Ticonderoga as CVS vice CVA (−$7,000,000), relating to the 5 fighter/attack squadrons deleted; reduced SEA tempo (−$7,300,000); other reductions primarily cost escalation increases denied for POL and repair parts (−$7,300,000), and general reduction against flying program including spare parts (−$7,200,000)	227.7	253.9	−28.8	225.1
Ship forces: Regular overhauls and nonscheduled repairs (including 2 SSN overhauls, 4 amphibious overhauls, and Kitty Hawk extended RAV) for −$52,900,000. Ship operating funds reduced based on contention that fuel consumption overstated, and with OPTAR consumables reduced to 1972 level (−$15,500,000). Maintain and operate Ticonderoga as CVS vice CVA ($−2,700,000) AVCAL decreases, including Ticonderoga (−$7,000,000). Other decreases related cost escalation reductions for fuel, and ship OPTARS (−$50,000,000)	886.4	958.1	−128.1	830.0
Base operations	387.3	399.4	−12.4	387.0
Reduction to base operations support due to fewer ship-years and reduce Ticonderoga support				(−3.8)
Other decreases related to reductions in average man-year costs, ADP, and cost escalation				(−12.1)
Relocation of P-3 squadrons from [deleted]				(+3.5)
Other budget activity 2 adjustments: Fleet training, unified and operational commands, and special combat support forces				(−6.6)

OPERATION AND MAINTENANCE, NAVY—FISCAL YEAR 1973 BUDGET—Continued

ANALYSIS OF BUDGET ACTIVITY OF OSD BUDGET CHANGES TO FISCAL YEAR 1973 PROGRAM—Continued

[In millions of dollars]

	Fiscal year 1972 column of fiscal year 1973 budget	Fiscal year 1973 navy request	Fiscal year 1973 OSD allowance	Fiscal year 1973 OSD adjustment
Budget Activity 3, intelligence and communications	296.0	319.8	313.6	−6.2
(a) ADP				−.4
(b) Cost escalation				−.4
(c) Intent of congressional action in intelligence				−4.1
(d) Intent of congressional action in the cryptologic program				−.9
(e) Telecommunication				−.4
(f) Civilian employment				−2.4
(g) Average man-year costs				−2.6
(h) Second destination transportation				+.3
(i) Drug abuse program				+.5
(j) Health benefits				+.2
(k) Revaluation of foreign currency				+.2
(l) Worldwide military command				+3.8
Budget activity 5, Reserve forces	118.9	139.4	136.1	−3.3
Ship repairs and overhauls				−3.3
Reduction in overhaul funds by slipping 1 overhaul to fiscal year 1974 (−$1,700,000) and reduction in MSO nonscheduled repairs since all MSOs are scheduled for either overhaul or interim drydocking during fiscal year 1973 (−$200,000)				−1.9
Los Alamitos: To provide station support for the DOD Armed Forces Reserve Center, Los Alamitos (formerly NAS)				+4.2
Other: Other adjustments were made in the budget estimates including reductions in civilian personnel, average man-year costs, and escalation offset by an increase for the cost of health benefits for civilians				−5.6
Budget activity 7, Central supply and maintenance	1,913.3	2,001.5	1,859.6	−141.9
Jan. 1 pay raise included	(18.7)	(36.1)	(36.1)	
Air system technical support: Adjustments include: $8,600,000 for cost escalation, $19,900,000 due to increased efficiency of HARFS, $15,100,000 reduction in component repairs, $6,200,000 associated with TICO, $5,800,000 decrease to aircraft reworks, $13,800,000 in other engineering and support. Reduction in average man-year costs entailed a further $7,600,000, and $3,000,000 resulted from CIVPERS reductions. $5,100,000 related to SEA sortie rate changes. Other miscellaneous reductions totalled $10,100,000. Adjustments for transportation rates, foreign currency and other changes resulted in an offsetting increase of $4,400,000				−90.8
Ordnance system technical support: Net reduction is comprised of $2,100,000 in increases related to rate changes, offset by decreases totaling $17,200,000. The latter include $1,100,000 for cost escallation, $11,800,000 related to various ASW, SMS and ordnance programs, $3,700,000 reduction in man-year and CIVPERS reductions, and $600,000 miscellaneous				−15.1
Ship system technical support: Rate increases of $7,000,000 are offset by $33,800,000 reductions: $14,600,000 related to planned conversion of NAVSEC to HIF, $10,700,000 in engineering and support, $3,800,000 man-year costs, $2,300,000 CIVPERS and other miscellaneous of $2,400,000				−33.1
Electronic system technical support: $800,000 in rate changes, offset by $400,000 adjustment for cost escalation, $1,300,000 man-year costs, and $100,000 CIVPERS decrease				−.9
Facilities technical support: $1,200,000 increase for transportation/currency rate changes is offset by $1,100,000 reduction in man-years costs, $900,000 CIVPERS and $300,000 miscellaneous other				−1.1
Supply support: Transportation rates, currency revaluation and 1 functional transfer generate increases of $5,200,000; an additional $10,000,000 was also provided for transportation, aothough $8,400,000 of this amount was diverted to offset overpricing of the CIVPERS PBD ($1,600,000 net increase). The account was decreased $6,600,000 relative to average man-year costs and CIVPERS reductions				+.2
Material command and support: Relates to reductions to reductions in ADP ($500,000), man-years costs ($300,000), CIVPERS adjustments ($200,000), and rounding ($100,000)				−1.1

OPERATION AND MAINTENANCE, NAVY—FISCAL YEAR 1973 BUDGET—Continued

ANALYSIS OF BUDGET ACTIVITY OF OSD BUDGET CHANGES TO FISCAL YEAR 1973 PROGRAM—Continued

[In millions of dollars]

	Fiscal year 1972 column of fiscal year 1973 budget	Fiscal year 1973 navy request	Fiscal year 1973 OSD allowance	Fiscal year 1973 OSD adjustment
Budget activity 8, training, medical and other general personnel support	632.2	691.2	75.9	−15.3
New programs: To provide funds for Navy-wide drug and alcohol education and rehabilitation				+3.8
All volunteer force: For continuation of 1972 programs plus expanded programs in selected areas of recruiting and education				+14.0
Training: Savings from improved management resulting from newly organized Naval Training Command (−$1,700,000); reduction in pilot training output based on a projected increase in retention and reduced pilot requirements (−$1,000,000); reduction in the human relations program on the basis that a tripling of the program is premature in the absence of any experience on program strength (−$2,700,000); reduction in medical and dental scholarships pending legislation approval of program expansion (−$200,000) reduction in NROTC because of an overstatement of enrollments (−$100,000); reduction in graduate education in graduate education in anticipation of more restricted position validation procedures and improved utilization of advanced degree holders (−$200,000)				−5.9
Overseas dependent's schools: Reduction based on revised enrollment forecast				−.3
Medical: Decreased funds for psychiatric care in non-service facilities because of the hiring of a psychiatrist by OCHAMPUS to aid in reducing charges (−$1,700,000); based on an OSD adjustment in workload, hospital operations were reduced (−$2,200,000); also reduced were personnel support equipment (−$200,000) and public works operations (−$1,100,000); defers various medical reforms (standards of service) pending completion of a study regarding reduced reliance on in-house medical care (−$3,900,000); and reduces funds for care of the dead based on recent experience on normal mortality (−$200,000)				−9.3
Base support: Other adjustments were made in the budget estimates such as reductions in civilian personnel, average man-year costs, and escalation and increases for health benefits for civilian and currency revaluation				−17.6
Budget activity 9, administration and associated activities	176.9	180.5	173.8	6.7
Navy Secretariat/staff offices: The Navy Secretariat and its staff offices were decreased by −$2,100,000. Official representation was held at the fiscal year 1972 level (−$100,000). The service-wide support area was reduced by (−$1,200,000) on the basis that the increases did not appear justified in view of the overall reduction in Navy forces and strength. The Navy petroleum reserves were reduced by (−$500,000) by deferring a new well in the South Barrow, Alaska, gas field. The ADP program for SECNAV/Staff offices was reduced by (−$300,000)				−2.1
OPNAV: A general reduction against OPNAV permitting Navy selection of implementation (−$2,500,000). An additional reduction of (−$100,000) was taken by the intelligence staff in an effort to avoid duplication and also in accord with overall reductions in the intelligence program				−2.6
Public affairs: In order to bring the fiscal year 1973 public affairs program into agreement with the fiscal year 1972 approved congressional program, a reduction of (−$100,000) was taken				−.1
Other adjustments: The budget estimates were further adjusted to reflect reductions in average man-year coasts, escalation, and increases for health benefits for civilians				−1.9
Budget activity 10, support of other nations	73.8	64.9	58.7	−6.2
(a) Classified projects in SEA				+2.0
(b) Transfer of South Asia Military Sales Office to Navy				+.1
(c) Cost escalation				−1.3
(d) Interappropriation adjustments requested by SECNAV				−7.0

CHANGES IN 1972 FUNDING

Chairman ELLENDER. The second item I would like you to furnish the committee is a tabulation of the changes to the original fiscal year 1972 budget estimate that result in the revised 1972 estimates that appear in the fiscal year 1973 justification book. Please break this down by budget activity and budget program, listing the specific items and the amount of increase or decrease.

Admiral MINTER. I will provide that for the record, sir.

(The information follows:)

FISCAL YEAR 1972 CHRONOLOGY

OPERATIONS AND MAINTENANCE, NAVY

Summary

Congressional initial submission	$4,977,000
January 1, 1971, pay raise amendment	+78,914
Subtotal	5,055,740
Drug rehabilitation amendment	+2,826
Fiscal year 1972 congressional requested—amended	5,058,740
Reduction	−37,000
Enacted	5,021,740
Unobligated balance transferred from procurement, Marine corps	+47,500
GSA-leasing	−120
Proposed Supplemental for Wage Board Increase	+39,000
January 1972 pay increase supplemental/amended	+37,405
Fiscal year 1972 column of 1973 budget	5,145,525

BY BUDGET ACTIVITY AS AMENDED

Budget activity 1.—Strategic forces

Fiscal year 1972 congressional budget	$264,771
Congressional action	−255
Fiscal year 1972 enacted	264,516
Supplemental and appropriation transfer (Wage Board Supplemental, January 1972 pay raise, transfer—health benefits)	+2,837
Increased charter and hire costs—one additional ship MSC	+1,476
Fleet ballistic missile program (repair components $6,100; and operational support for contractor technical support $12,200)	+18,300
Overhaul slippage	−10,000
Miscellaneous increases and decreases—minor items	+640
Fiscal year 1972 column of fiscal year 1973 budget	277,769

Budget activity 2.—General Purpose Forces

Fiscal year 1972 congressional submission	1,611,393
Congressional action	−5,185
Fiscal year 1972 enacted	1,606,208
Supplemental (Wage Board and January 1972 classified pay raise)	+27,357
Appropriation transfers—dollar revaluation and health benefits	+4,705
Base operations costs and Navy distillate fuel	+16,200
Functional transfer (realinement between budget activities)	−1,742
Base costs related to base closures/realinement actions	+3,880
Fiscal year 1972 column of fiscal year 1973 congressional budget	1,656,608

Budget activity 3.—Intelligence and communications

Fiscal year 1972 President's budget	$295,314
Congressional actions	−7,893
Fiscal year 1972 enacted	287,421
Appropriation transfers	+649
Additional flight operations and ADP increases for operational commanders	+103
Communications Command—increased cost of rents and utilities	+900
Intelligence Command—increased requirements/efforts for the undersea surveillance program	+2,350
Chief of Naval Operations—required for worldwide military command and control support and maintain effort at the Naval Observatory	+1,023
Oceanographer of the Navy—reduction for civilian personnel from previously budgeted estimates	−481
Naval Security Group Command—increased cost of rents and utilities	+200
Weather Command—increased cost of rents and utilities	−100
Functional transfers (realinement other budget activities)	+246
Pay raise supplemental, ungraded	+632
Pay raise supplemental, graded	+3,107
Fiscal year 1972 column of fiscal year 1973 President's budget	296,050

Budget activity 5

Fiscal year 1972 President's budget (as amended)	$115,263
Congressional actions—None	—0—
Fiscal year 1972 enacted	115,263
Appropriation transfers—Civilian health benefits	+29
Additional ship maintenance requirements	+2,899
Additional station operation costs	+211
Other adjustments	−46
Functional transfers (realinement between budget activities)	−431
Pay raise supplemental	+1,018
Fiscal year column of fiscal year 1973 President's budget	118,943

Budget activity 7.—Central supply and maintenance

Fiscal year 1972 congressional submission January 1971	$1,961,660
Congressional reductions (Headquarters, automatic data processing, service support costs, etc.)	−19,938
Fiscal year 1972 enacted	1,941,722
Realinement of funding for the Naval Photographic Center, Washington, and the Naval Support Activity, Mare Island, Calif., to program 9	−8,378
Apportionment reprograming to fund higher priority requirements such as the fleet ballistic missile program, increased fuel costs, and medical care, etc	−55,381
Increased health benefits, +$1.4 M; and foreign currency revaluation, +$2.4 M	+3,762
Pay raise supplemental—Ungraded wage board, +$12,861; graded 5½ percent Jan. 1, 1972, +$18,653	+31,514
Fiscal year 1972 column of fiscal year 1973 budget	1,913,239

Budget activity 8

Fiscal year 1972 President's budget	$575,149
Congressional actions	−3,034
Fiscal year 1972 enacted	572,115
CHAMPUS	+37,500
Civilian health benefits	+268
Dollar reevaluation	+112
GSA leases (transfer to GSA)	−7
Medical facilities—operating costs	+3,700
Outpatient facilities expansion	+987
Eye glasses—plastic/tempered lens	+300
On-going medical ADP programs	+500
Nurses' baccalaureate program	+200
Alcohol rehabilitation clinic	+100
Human relations program	+4,500
Fuel and utilities cost escalation	+3,200
Other increases	+204
ADP equipment lease savings	−263
Functional transfers (realinement from other budget activities)	+1,751
Pay raise supplemental	+7,074
Fiscal year 1972 column of fiscal year 1973 President's budget	632,241

Budget activity 9—Administration and associated activities

Fiscal year 1972 congressional	$162,138
Congressional actions	−695
Fiscal year 1972 enacted	161,443
Appropriation transfer—Dollar revaluation, health benefits and GSA	+376
Supplemental—Wage Board and January 1972 pay raise	+2,879
Functional transfer (realinement between budget activities including Naval Photo Center +$4,443 and NSA Mare Island $3,139)	+12,209
Fiscal year 1972 column of fiscal year 1973 budget	176,907

Budget activity 10—Support of other nations

Fiscal year 1972 congressional submission (fiscal year 1972)	$73,052
Reprograming for increased JUSMAAG Korea support	400
Reprograming for increased classified projects	308
Realinement of public affairs funds to Budget activity 9	(3)
Classified pay raise	11
Fiscal year 1973 congressional submission (fiscal year 1972)	73,708

1973 Request Compared With 1972

Chairman Ellender. Finally, using the same format as in my last request, I would like you to furnish the committee a tabulation of the increases and decreases, from the revised 1972 estimates that you are requesting in the fiscal year 1973 budget. We have or will have covered most of these during the course of the hearing but I would like to have it all consolidated for when it comes time to sit down and make some decision.

Admiral Minter. I will provide that for the record, sir.

(The information follows:)

SUMMARY OF INCREASES AND DECREASES—FISCAL YEAR 1972 REVISED COMPARED TO FISCAL YEAR 1973 REQUEST

Budget activity 1

Fiscal year 1972	$277,769
Ship overhauls	+23,712
Ship operations	+932
Maintenance support of communication and expanded CEP	+2,700
Strategic system technical support	+1,073
Nonscheduled ship repairs	−920
Miscellaneous minor increases and decreases	−87
Fiscal year 1973 budget	305,179

Budget activity 2.—General purpose forces

Fiscal year 1972	$1,656,608
Aircraft activity reduction SEASIA	−5,100
Aircraft fuel price increase	+3,600
Reduction in programed hours	−1,100
Other miscellaneous air forces adjustments	+71
Ship forces program	−36,375
Ship operations	(+11,109)
Regular ship overhauls	(−58,163)
Nonscheduled repairs	(+6,041)
Operation of AO by MSC	(+4,576)
Other miscellaneous adjustments	(+62)
Real property maintenance	−2,870
Transfer of NAO costs from Budget Activity 9	+5,941
Currency revaluation	+1,427
Civilian personnel costs	−5,279
Phase down of Naval Stations San Juan and Rodman	−3,008
Additional station support costs due to relocation of a patrol squadron and support units	+2,700
Construction battalion support	−4,566
Unified and operational command support	−2,145
Special combat support force service craft overhaul	+1,155
Miscellaneous (+ or −)	+611
	−44,938
Fiscal year 1973 budget request	1,611,670

Budget activity 3

Fiscal year	$296,050
Cryptologic program	+4,514
Installation of new cryptologic equipment and national SIGINT operational tasking.	
GDIP program:	
(a) Intelligence activities	+6,113
Scientific and technical intelligence	−73
Fleet tactical intelligence support	+1,510
Intelligence data handling systems	+982
Counterintelligence and investigative activities	+911
Imagery	+950
Intelligence production	+284
Special intelligence communications	+446
Intelligence management and support	+322
Human intelligence (HUMINT)	+352
Electronic intelligence (ELINT) centers	−10
Technical sensor collection	+439
(b) Mapping, charting, and geodesy	−1,831
Civilian personnel reductions	−3,590
Graded pay raises	+1,112
MSC charter and hire increases	+892
Reduced level operations of new, large coastal Hydrographic Survey Ship	−362
Increased operating costs—NAVOCEANO	+117
Naval communications	+5,053
(a) Leased communications—Increased tariff and subscriber rates for AUTODIN lease services	+1,665
(b) Station operations—Automating of communication stations; continued installation of new communications equipment; increased costs for fuel and utilities	+3,388
Oceanography: Increase in cost for support of Antisubmarine and undersea warfare programs	+609
Weather service: Increased costs of satellite date collection capabilities	+299
Specialized support activities: Increased costs for worldwide military command and combat systems automation program	+2,747
	+17,519
Fiscal year 1973 program	313,569

Budget activity 5

Fiscal year 1972	$118,943
Increases	+19,476
Naval Aviation Reserves	+2,682
Naval Reserve ship repairs	+8,756
Naval Reserve ship operations	+1,876
Base operations (air support)	+3,462
Base operations (surface/subsurface)	+2,663
Other increases	+37
Decreases	−2,300
Aviation depot maintenance	−2,300
Fiscal year 1973 estimate	136,119

Budget Activity 7

Fiscal year 1972		$1,913,239
Increase/decrease fiscal year 1973 versus fiscal year 1972:		
Major increases		+58,608
Pollution abatement (Navships +$0.6 million; Navfac +$8.3 million)	+8,902	
Nuclear Power Training Facility (Navships)	+12,000	
Naval Training Device Center, Orlando, Fla. (Navelex) transfer from R.D.T. & E.N. of $7.2 million	+6,768	
Commissary stores (Navsup) Monday openings, two new stores, increased sales, et cetera	+2,059	
Employees compensation bills from Department of Labor (transferred from prog 9—Navcompt)	+21,046	
Miscellaneous (Air +$2,555; Ord. +$803; Ships +$2,065; Elex +$1,219; Fac +$1,191)	+7,833	
Major decreases		−112,249
Second destination transportation (Air −$7,490; Fac −$1,557; Sup −$11,472)	−20,519	
Naval Ship Engineering Center (Navsec) planned change in accounting system (Navships)	−17,315	
Supply depots, ICP's and other supply functions (Navsup)	−12,476	
Aircraft and air launched weapon rework (A/C −$5,735; A/L weapons (−$2,059) (Navair)	−7,794	
Catapults, arresting gear and landing aids (Navair)	−7,968	
Miscellaneous (Air −$10,510; Ord. −$13,749; Ships −$15,690; Elex +$2,404; Fac +$3,010; Navmat −$814)	−46,177	
Fiscal year 1973 budget request		1,859,598

Budget Activity 8

Fiscal year 1972 program		$632.2
Drug education and rehabilitation	+$6.5	
Alcohol rehabilitation	+.4	
Human relations program	+1.5	
All Volunteer Force program	+9.8	
Champus	+15.5	
Classified pay raise	+4.9	
Medical support	+3.8	
Training support	+1.3	+43.7
Fiscal year 1973 program		675.9

Budget activity 9.—Administration and associated activities

Fiscal year 1972 column		$176,907
(*a*) Civilian personnel reduction, headquarters, offsetting pay raise		—72
(*b*) Functional transfer of NATO to B. A. 2 (Lantflt and Naveur)		—5,682
(*c*) Civilian personnel reductions and related costs at OPNAV field activities (principally naval districts including Navsta Washington, D.C.)—offsetting pay raise		—1,633
(*d*) Service wide support activities of the Navy Secretariat (including pay raise)		+3,222
(1) Navy wide finance activities (including JUMPS implementation)	+2,530	
(2) Naval audit service	+246	
(3) Naval petroleum reserve	+898	
(4) Official mail reimbursement	+13,977	
(5) Employees compensation to B. A. 7	—14,596	
(6) Other Secnav activities increases	+167	
(*e*) Personnel reduction and related costs at OPNAV activities in Budget Program C—offset by pay raise		—329
(*f*) Decreased other purchased services at NSA New Orleans		—162
(*g*) Overhaul of U.S.S. *Constitution*		+1,558
(*h*) Increased requirements—Naval Photographic Center (including pay raise)		+15
(*i*) Pay raise for public affairs		+10
Fiscal year 1973 budget request		173,834

Budget activity 10.—Support of other Nations

Fiscal year 1972	$73,768
Disestablishment of NSA Saigon	(8,333)
Disestablishment of NSF Danang	(2,613)
First quarter fiscal year 1973 disestablishment Comnavforv	(439)
Reduction in classified projects requirements	(2,986)
Transfer of MASF Thailand to MAP	(1,612)
Reduction in MAAG's, Missions, and MAGS funding	(645)
Increase in national costs of SEATO	4
Increased funding for MASF, Vietnam program	1,553
Fiscal year 1973 budget request	58,697

REVOLVING AND MANAGEMENT FUNDS

Chairman ELLENDER. R. Adm. S. H. Moore, the Director of Budget and Reports, has a prepared statement on the Navy and Marine Corps Stock and Industrial Funds which will appear in the record at this point.

(The statement follows:)

STATEMENT OF ADMIRAL S. H. MOORE

Mr. Chairman and members of the committee: It is my pleasure to appear before you again to present the revolving and management funds. These are the Navy and Marine Corps Stock Funds and Industrial Funds, the Navy Management Fund, and the Naval Working Fund.

Since the purposes for which these funds were established remain unchanged, I will limit my discussion to changes which have occurred with respect to administration of these working capital funds, since last year.

NAVY MANAGEMENT FUND

The Navy Management Fund was established in 1950 to facilitate the financing of operations, which are supported by two or more appropriations, when it is not practicable to make a direct distribution of charges at the time the expense is incurred.

The programs financed through this fund are reviewed and justified as part of their respective parent appropriations or fund. Transfers are made from the parent appropriation or fund to the Management Fund, which acts as a "clearing house" in the settlement of charges.

Management fund requirements in FY 1973 are $451.7 million, of which $450 million is to finance transportation of material and equipment. These transportation requirements are funded in various appropriations, principally the Operations and Maintenance, Navy and Military Personnel, Navy appropriations. The remaining $1.7 million FY 1973 requirement finances departmental office moves, maintenance of office space and expenses incurred by the Armed Services Board of Contract Appeals.

NAVAL WORKING FUND

The Naval Working Fund was established in 1924 to account for advances received by the Navy for the cost of material or services furnished to other Government agencies, foreign governments and private parties. These advances are then used to reimburse the Operations and Maintenance, Navy appropriations for the value of goods provided or services rendered. The nature of work or services performed is generally related to furnishing utilities, maintenance work and equipment rental.

The total activity in the Naval Working Fund in FY 1973 is estimated at $17 million, the same level as anticipated for FY 1972.

STOCK FUNDS

The Navy and Marine Corps Stock Funds continue to serve as the financing media for the purchase of consumable type material which is held in inventory until use. My statement will cover operations of these funds for Fiscal Year 1971 and proposed operations for Fiscal Years 1972 and 1973. As Director of Budget and Reports for the Department of the Navy, my chief responsibility concerning these funds is in the area of financial management. I have with me representatives from the Navy and Marine Corps who are responsible for the program management and day-to-day operations.

NAVY STOCK FUND

The significant financial and operational aspects of the Navy Stock Fund are depicted in the following table:

[Millions of dollars]

	Fiscal year 1971 actual	Fiscal year 1972 estimate	Fiscal year 1973 estimate
Financial condition:			
Assets:			
Cash	$28.7	$108.7	$187.7
Inventories	1,759.2	1,613.5	1,504.1
Other assets	139.2	129.3	128.8
Total assets	1,927.1	1,851.5	1,821.2
Liabilities and Government equity:			
Accounts payable	133.9	139.9	139.9
Other liabilities	15.2	15.2	15.2
Government equity	1,778.0	1,696.3	1,666.1
Total	1,927.1	1,851.5	1,821.2
Operating condition:			
Revenue and expense:			
Sale of goods	1,748.4	1,822.0	1,847.5
Expenses	1,783.4	1,918.1	1,880.4
Net loss or gain	−35.0	−96.1	−32.9
Other:			
Obligations	1,677.8	1,753.5	1,778.7
Expenditures	1,770.2	1,767.0	1,769.0

The $80.0 million increase shown in the cash balance projected for FY 1972 relates to a planned $15 million cash transfer from the Defense Stock Fund and by sales or revenue exceeding outlays by $65 million during the year. These planned increases in the cash account for the current year will bring the end year cash balance to a level equal to the cash requirement prescribed for stock funds by the Secretary of Defense. A further increase during Fiscal Year 1973 of $79.0 million will result in a cash balance of $187.7 million by the end of that year. This further increase in Fiscal Year 1973 will be made possible solely from the fund's operations. The planned cash increases to result from fund operations during Fiscal Years 1972 and 1973 are attributed, in large measure, to the sale of material in long supply and returns of excess material from customers which can be used to offset new procurement requirements.

The drawdown in inventory as shown for the current and budget years reflects aggressive efforts on Navy's part to rid the fund of excess stocks and to operate a more efficient system in which fewer operating stocks are required. The present plans are that excess or long supply stocks will be reduced from $871.0 million at the end of Fiscal Year 1971 to $735.2 million by the end of the current year. A further reduction to $594.6 million is planned for Fiscal Year 1973. Operating stocks are expected to drop from $696.8 million on hand at the end of Fiscal Year 1971 to $657.5 million at the end of Fiscal Year 1973. Concurrently, the annual sales program supported by these stocks is expected to increase from $1,748.4 million to $1,847.5 million.

The trend toward a stronger and more favorable financial position is expected to continue. The cash position is expected to improve appreciably while the liabilities of the fund are expected to remain relatively constant.

The net losses to the fund as shown for the three years relate primarily to decreases in long supply or excess stocks. Over $214 million in inventory was disposed of in 1971. This rather large amount of disposal, when netted with other inventory accounting transactions, resulted in a net loss of $35 million for that year. It should be noted that a large part of the inventory disposed of was actually material that had been returned from customers without charge to the fund. Even though disposal of this material is accounted for as a loss to the Navy Stock Fund it is not a real loss due to stock fund management. Disposals in Fiscal Years 1972 and 1973 are estimated to be $196.6 million and $137.6 million, respectively.

The slightly rising sales trend shown over the three years is attributable mainly to rising prices for fuel products and an increased sales volume in commissary store stocks. Obligational authority has been planned consistent with the sales trend and in keeping with the fund's ability to sell long supply stocks which do not need to be replaced.

The Navy recognizes the Navy Stock Fund as a vital funding mechanism for consumable items of supply; it has a profound impact on fleet support and readiness. Accordingly, a great deal of management effort and attention is devoted to keeping it in a sound financial position and to assuring that its operating policies and procedures are not only effective supply-wise but also are designed and carried out with a view toward cost effectiveness.

MARINE CORPS STOCK FUND

The significant financial and operational data for the Marine Corps Stock Fund are shown in the following table:

[Millions of dollars]

	Fiscal year 1971 actual	Fiscal year 1972 estimate	Fiscal year 1973 estimate
Financial condition:			
Assets:			
Cash	$50.9	$54.9	$47.9
Inventories	247.1	210.5	171.1
Other assets	20.7	12.0	17.7
Total assets	318.7	277.4	236.7
Liabilities and Government equity:			
Accounts payable	22.7	22.7	22.7
Government equity	296.0	254.7	214.0
Total	318.7	277.4	236.7
Operating condition:			
Revenue and expense:			
Sale of goods	202.8	185.0	190.0
Expenses	−185.2	226.3	230.7
Net loss or gain	17.6	−41.3	−40.7
Other:			
Obligations	154.6	184.5	192.5
Expenditures	183.5	181.0	197.0

These data show that the Marine Corps Stock Fund is currently in a very sound financial position and the prospects are that it will remain so. The cash balance will remain relatively constant through the budget year, and no increase in liabilities is expected. The decrease in inventories over the three year period reflects a sizable reduction in long supply or excess stocks and some increase in peacetime operating and war reserve stocks. Long supply stocks will decrease from $155.3 million on hand at the end of FY 1971 to $40.2 million by the end of FY 1973. During this same timeframe war reserve stocks will go from $39.4 million to $76.3 million, an increase of $36.9 million. $16.2 million of this increase will result from procurement of new stocks and the remaining $20.7 million will come from long supply stocks and material returned from operating units which are no longer required.

The sales trend reflects the needs of the operating units, taking into consideration that redeployment of forces from overseas that were previously supported in part by the Navy supply system now requires more internal support by the Marine Corps.

Obligations for Fiscal Years 1972 and 1973 parallel the sale of goods. In Fiscal Year 1971 sales exceeded obligations by $48.2 million. This difference reflects the ability of the fund to offset new procurement requirements with material returned from users and from long supply stocks made available because of force level and operational reductions.

The net losses of $41.3 million and $40.7 million projected respectively for Fiscal Years 1972 and 1973 reflect the disposal of excess and long supply stocks of which about $19 million is to be received from operating units as excess to their needs and not required within the fund.

NAVY INDUSTRIAL FUND

As of 1 January 1972 the Navy Industrial Fund included 101 activities. Of these, only 95 were fully operational. The remaining 6, consisting of 3 ordnance facilities and 3 research laboratories, have been disestablished and are in process of liquidation. These deactivations are the result of reduced customer spending plans and the consolidating of functions among fewer activities. Such actions are necessary to balance capacity against requirements as well as achieve economies in the use of resources.

Included among the 95 active accounts are two new activities established on 1 July 1971. These are the Naval Missile Center, Point Mugu, California and the Naval Underwater Systems Center, Newport, Rhode Island. The latter activity encompasses many research functions of two disestablished laboratories, the Naval Underwater Sound Laboratory, New London, Connecticut, and the Naval Underwater Weapons Research and Engineering Station, Newport, Rhode Island.

As you will recall, a change in billing procedures within the Navy Industrial Fund was instituted beginning in Fiscal Year 1968. Prior to that time, reimbursement for the cost of work or services ordered from the Navy Industrial Fund was generally accomplished upon acceptance of the order. Under the revised policy, which went into effect at that time and which has remained in effect, reimbursement of costs are made on a progress payment basis. This change from prepayment procedures served to reduce the large cash balances previously maintained, but required continuation in the industrial fund accounts of a small prepayment from the SCN appropriation to preclude an overall fund cash shortage. In Fiscal Year 1971 a cash transfer from DOD stock funds to the Navy Industrial Fund under authority of Section 839 of Public Law 91-668 made possible the final liquidation of this prepayment. This transfer is reflected by the increase of our cash corpus in Fiscal Year 1971 of $158 million and a concurrent reduction in advances from customers.

For Fiscal Year 1971, the Navy Industrial Fund operations resulted in a net gain of $21.7 million, largely offsetting a Fiscal Year 1970 loss. For the current fiscal year we are projecting a gain of $5.8 million, and for the budget year (Fiscal Year 1973) a loss of $5.8 million. Sealift operations account for the majority of the aforementioned gains and losses. Virtual breakeven operations could have been achieved for each fiscal year; however, this would have required sharp adjustments in tariff rates within the year to meet varying workload and cost conditions. In lieu of sharply fluctuating tariff rates, the policy has been to maintain insofar as possible a stabilized rate over a period of months, sometimes extending into the next fiscal year. This tends to simplify the budgeting of appropriation expenditures for sealift, even though application of stabilized rates has at times resulted in relatively small losses or gains.

Exhibit I provides the amount of gain or loss by activity group. The net gain of $21.7 million is less than .6% on total sales of $4.2 billion. Exhibit II lists the activities under the Navy Industrial Fund on 1 January 1972, together with pertinent operating information. Exhibit III provides a summary of changes in activities operating under the Navy Industrial Fund, since 30 June 1971.

MARINE CORPS INDUSTRIAL FUND

The Marine Corps Industrial Fund comprises two Depot Maintenance activities, located at the Marine Corps Supply Centers, Albany, Georgia and Barstow, California. Total sales for these two activities amounted to $24.3 million in Fiscal Year 1971, resulting in a net loss of less than $.1 million on operations. This was a variation of less than .4%.

This completes my statement, Mr. Chairman and we stand ready to answer any questions you might have on the Department of the Navy Revolving Funds.

EXHIBIT I.—NAVY INDUSTRIAL FUND STATEMENT OF REVENUE AND EXPENSE BY ACTIVITIES, FISCAL YEAR 1971

[In thousands of dollars]

	Revenue	Expense	Gain/loss
Shipyards (10)	$1,089,648	$1,088,945	$703
Military Sealift Command (1)	890,501	874,604	15,897
Aircraft maintenance (7)	567,548	567,331	217
Ordnance plants (16)	482,700	482,295	405
Research plants (17)	947,751	943,640	4,111
Base services (8)	168,561	168,576	(15)
Printing plants (37)	58,597	57,946	651
Polaris missile facilities (3)	26,249	26,498	(249)
Total (99)	4,231,555	4,209,835	21,720

EXHIBIT II.—NAVY INDUSTRIAL FUND ACTIVITIES AS OF JAN. 1, 1972

[In thousands of dollars]

	NIF implemented	Cash allocation	Estimated sales fiscal year 1973
Shipyards (10) (under NAVSHIPS management)		$71,500	$1,114,478
Philadelphia, Pa	April 1952	8,500	
Charleston, S.C	July 1953	5,500	
Norfolk, Va	do	8,000	
Portsmouth, N.H	April 1954	7,600	
Boston, Mass	do	9,800	
Puget Sound, Wash	July 1954	6,500	
Long Beach, Calif	August 1954	4,600	
Mare Island, Calif	February 1970	10,000	
Hunters Point, Calif	do	5,500	
Pearl Harbor, Hawaii	December 1954	5,500	
Military Sealift Command (1) (under CNO management)	July 1951	31,000	694,859
Aircraft maintenance (7) (under NAVAIR management)		40,700	550,487
Quonset Point, R.I	May 1959	3,300	
Alameda, Calif	March 1962	8,300	
North Island	April 1962	6,900	
Norfolk, Va	July 1962	10,700	
Cherry Point, N.C	August 1962	2,600	
Jacksonville, Fla	October 1962	2,400	
Pensacola, Fla	November 1962	6,500	
Ordnance plants (16) (under NAVORD management)		25,800	449,150
Forest Park, Ill.[1]	January 1953	1,100	
Indian Head, Md	October 1953	4,450	
Louisville, Ky	February 1957	2,200	
Yorktown, Va	April 1959	1,050	
Keyport, Wash	January 1960	2,000	
Bangor, Wash.[1]	July 1967	750	
Crane, Ind	do	2,350	
Earle, N.J	do	1,100	
Hawthorne, Nev	do	1,100	
McAlester, Okla	do	1,650	
Oahu, Hawaii	do	750	
Charleston, S.C	do	400	
Concord, Calif	do	2,500	
Seal Beach, Calif	do	1,800	
Port Hueneme, Calif. (NSMSES)	July 1969	1,600	
Corona, Calif. (FMSAEG)[1]	July 1970	1,000	
Polaris missile facilities (3) (under special projects office management)		2,155	30,633
Atlantic, Charleston, S.C	July 1967	675	
Pacific, Bangor, Wash	do	280	
NSSNF Brooklyn, N.Y	July 1970	1,200	
Research activities (19) (under ONR management)		58,700	1,158,440
NRL Washington, D.C. (under NAVAIR management)	January 1953	6,600	
NAFI Indianapolis, Ind	July 1955	3,300	
NAPTC Trenton, N.J	July 1959	1,200	
NATC Patuxent River, Md	July 1969	1,500	
NAEC Philadelphia, Pa	do	5,000	
NMC Point Mugu, Calif. (under DLP management)	July 1971	4,000	
NWC China Lake, Calif	January 1969	5,900	
NSRDC Washington, D.C	July 1957	4,000	
NSRDL Panama City, Fla	July 1968	700	
NURDC San Diego, Calif	July 1969	1,700	
NELC San Diego, Calif	do	1,000	
NCEL Port Hueneme, Calif	do	500	
NUSL New London, Conn.[1]	do	200	
NUWRES Newport, R.I.[1]	do	200	
NASL Brooklyn, N.Y.[1]	do	800	
NADC Warminster, Pa	do	4,000	
NOL White Oak, Md	do	5,500	
NWL Dahlgren, Va	do	2,600	
NUWSC Newport, R.I	July 1971	10,000	

EXHIBIT II.—NAVY INDUSTRIAL FUND ACTIVITIES AS OF JAN. 1, 1972—Continued

[In thousands of dollars]

	NIF implemented	Cash allocation	Estimated sales fiscal year 1973
Base se rvices (8) (under NREC management)		13,500	194,095
PWC Norfolk, Va	July 1957	2,900	
PWC Pearl Harbor, Hawaii	November 1958	1,800	
PWC Newport, R.I	July 1959	900	
PWC Guam, M.I	April 1962	2,000	
PWC Subic Bay, R.P	July 1962	2,200	
PWC San Diego, Calif	July 1963	1,700	
PWC Great Lakes, Ill	July 1967	1,000	
PWC Pensacola, Fla	do	1,000	
Printing plants (37) (under NAVSUP management)		1,725	61,458
Navy Publication and Printing Service: [2]			
Philadelphia, Pa	September 1951	1,225	
Norfolk, Va	September 1951		
New Orleans, La	November 1951		
Pensacola, Fla	September 1952		
San Juan, P.R	September 1960		
Charleston, S.C	November 1952		
Brooklyn, N.Y	December 1952		
Washington, D.C	December 1952		
Boston, Mass	January 1953		
Great Lakes, Ill	February 1953		
Bremerton, Wash	March 1953		
San Diego, Calif	April 1953		
Vallejo, Calif	May 1953		
Pearl Harbor, Hawaii	June 1953		
Naples, Italy	September 1953		
Defense Printing Service:		500	
Subtotal (101 activities)		245,080	4,253,600
Unallocated cash		92,737	
Losses on closed activities		5,952	
Total		343,769	4,253,600

[1] Activities disestablished—in process of liquidation.
[2] Includes listed major plants plus 21 branch plants not listed.

EXHIBIT III

CHANGES IN ACTIVITIES OPERATING UNDER THE NAVY INDUSTRIAL FUND, FISCAL YEAR 1972

ADDITIONS TO NIF

1. Naval Missile Center, Point Mugu, California.
2. Naval Underwater Systems Center, Newport, Rhode Island.

DELETIONS FROM NIF

1. Naval Underwater Sound Laboratory, New London, Connecticut—merged with Naval Underwater Systems Center, Newport, Rhode Island.
2. Naval Underwater Weapons Research and Engineering Station, Newport, Rhode Island—merged with Naval Underwater Systems Center, Newport, Rhode Island.

Other Procurement, Navy

STATEMENT OF VICE ADM. C. S. MINTER, JR., USN, DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)

ACCOMPANIED BY:

REAR ADM. G. HALVORSON, USN, PROGRAM MANAGER, MK–48 TORPEDO WEAPONS SYSTEM, NAVAL ORDNANCE SYSTEMS COMMAND

REAR ADM. N. SONENSHEIN, USN, COMMANDER, NAVAL SHIP SYSTEMS COMMAND

REAR ADM. A. H. CLANCY, USN, ASSISTANT COMMANDER FOR MATERIAL

REAR ADM. P. B. ARMSTRONG, USN, MANAGER, ASW SYSTEMS PROJECT OFFICE

REAR ADM. M. W. WOODS, USN, COMMANDER, NAVAL ORDNANCE SYSTEMS COMMAND

REAR ADM. S. H. MOORE, USN, DIRECTOR OF BUDGET AND REPORTS, OFFICE OF THE NAVAL COMPTROLLER

CAPT. P. F. KENNEDY, SC, USN, COMPTROLLER, NAVAL ELECTRONICS SYSTEMS COMMAND

CAPT. A. L. STICKLES II, USN, ASSISTANT TO DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS) FOR PROGRAMS AND BUDGETS

CAPT. J. L. WOODBURY, USN, ASSISTANT APPROPRIATIONS COMMITTEE, LIAISON OFFICER, OFFICE OF NAVY COMPTROLLER

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BUDGET REQUEST AND 1972 APPROPRIATION

Chairman Ellender. Admiral, you are wearing two hats today. The next appropriation to be considered is "Other Procurement, Navy." The fiscal year 1973 budget is $2,023,200,000. The fiscal year 1972 appropriation was $1,641,603,000.

PROGRAM AND FINANCING

At this point in the record there will appear certain program and financing information from the justifications.

(The information follows:)

DEPARTMENT OF DEFENSE (MILITARY) OTHER PROCUREMENT, NAVY PROGRAM AND FINANCING

[In thousands of dollars]

	Budget plan (amounts for procurement actions programed)			Obligations		
	1971 actual	1972 estimate	1973 estimate	1971 actual	1972 estimate	1973 estimate
Program by activities:						
Direct:						
1. Ships support equipment	540,898	507,117	532,400	505,722	442,400	505,600
2. Communications and electronics equipment	311,233	352,200	456,300	275,951	353,500	437,300
3. Aviation support equipment	278,084	389,500	376,500	288,838	389,800	369,500
4. Ordnance support equipment [1]	431,645	441,482	560,600	439,649	499,185	522,400
5. Civil engineering support equipment	49,370	40,100	50,400	54,113	53,200	48,100
6. Supply support equipment	6,855	6,599	8,400	7,739	7,100	7,700
7. Personnel and command support equipment	59,926	31,705	38,600	50,986	36,700	39,500
Total, direct	1,678,011	1,768,703	2,023,200	1,622,998	1,781,885	1,930,100
Reimbursable (total)	261,295	324,536	399,300	180,677	343,200	334,500
Total	1,939,306	2,093,239	2,422,500	1,803,675	2,125,085	2,264,600
Financing:						
Receipts and reimbursements from—						
Federal funds [2]	−255,081	−232,435	−332,800	−242,452	−232,435	−332,800
Trust funds	−9,573	−106,501	−66,400	−18,048	−106,501	−66,400
Non-federal sources	−3,640	−2,700	−100	−2,295	−2,700	−100
Unobligated balance available, start of year—						
For completion of prior-year budget plans				−631,611	−656,585	−539,739
Available to finance new budget plan	−63,454			−63,454		
Reprograming from (−) or to prior-year budget plans	−105,158	−85,000				
Unobligated balance transferred from other accounts		−110,000			−110,000	
Unobligated balance transferred to other accounts		85,000			85,000	
Unobligated balance available, end of year—for completion of prior-year budget plans				656,585	539,739	697,639
Budget authority	1,502,400	1,641,603	2,023,200	1,502,400	1,641,603	2,023,200
Budget authority:						
Appropriation	1,487,300	1,641,603	2,023,200	1,478,300	1,641,603	2,023,200
Transferred from other accounts	15,100			15,100		
Appropriation (adjusted)	1,502,400	1,641,603	2,023,200	1,502,400	1,641,603	2,023,200

[1] Includes $25,700,000 for other weapons and $194,000,000 for torpedoes and related support equipment in 1973 subject to congressional authorization.
[2] Reimbursements are derived principally from cash sales to foreign governments (10 U.S.C. 2210).

Chairman ELLENDER. You may proceed.

Admiral MINTER. Mr. Chairman, I appreciate the opportunity to appear before you again to present the fiscal year 1973 budget request for the other procurement, Navy appropriation. I will make the only formal statement on the overall appropriation. Representatives of the Naval Material Command and other Navy offices are here with me to respond in detail to questions in their area of specialty.

The "Other Procurement, Navy" appropriation funds for all major equipment and weapons except aircraft, missiles, and ships. The programs funded here are for the procurement of equipments and components which are either (1) consumed in the course of operation; (2) used as replacements for operationally deficient or worn out equipments; or (3) provided for modernization. Examples of consumable items include air and ship launched ordnance, sonobouys, spare and repair parts, et cetera. Replacement items include such things as nu-

clear cores and components, land transport equipment, submarine batteries, and ship-generators, et cetera. Modernization items include satellite communications, NATO Sea Sparrow, new and improved radar and sonar equipments, et cetera.

1972 APPROPRIATION AND 1973 BUDGET REQUEST

The fiscal year 1973 budget for the OPN account is $2,032.2 million representing a $254.5 million increase over the fiscal year 1972 program. The major increases are programed for antisubmarine warfare and antiship missiles defense programs, two areas of vital interest to the Navy.

While the budget activity format in this appropriation is cast identically to that presented in the past several years, I would like to deviate from past presentations by grouping line items from all budget activities related to a program entity, instead of merely enumerating items in each of the seven budget activities. In this way I hope to give you a more comprehensive view of the role these programs play in supporting and improving our naval posture. Ten such entities emerge, accounting for 88.2 percent ($1,784.1 million) of the fiscal year 1973 funding request. These programs are: antisubmarine warfare (ASW), expendable ordnance; antiship missile defense (ASMD); spare and repair parts; nuclear support; FBM/ULMS support; Navy/Marine Corps Aviation support; satellite communications; environmental protection; and ship alteration program.

I would like now to present individually the budget request for each of these 10 programs.

ANTISUBMARINE WARFARE PROGRAM (ASW)

The fiscal year 1973 OPN request includes funding in the amount of $527.4 million identifiable directly or indirectly with the Navy's antisubmarine warfare effort.

Chairman Ellender. Please provide for the record a tabulation identifying each of the items included in this total of $527.4 million for ASW efforts by budget activity and line number in the P–1 exhibit and the total amount requested for fiscal year 1973.

Admiral Minter. Yes, sir.

(The information follows:)

[Dollars in millions]—Fiscal year 1973

BA–LI and Item	
1–1—Submarine batteries	*2.1
1–10—Damped propeller	2.2
1–16—Submarine silencing equipment	*3.0
1–18—SINS systems mods	*1.8
1–19—Periscope type 18	5.0
1–20—Type 15 periscope improvements	1.5
1–40—300 KW motor generator	.7
1–45—LAMPS hanger extension mods	1.1
2–15—Integ comm antenna sub system	*5.1
2–22—Training equipment DD 963 Cl	1.7
2–25—Training equipment SSN 688 Cl	*1.8
2–26–39—Total electronics equipment ASW	75.5
2–42—AN/WLR–6 freq. extension kits SSEP	4.0
2–43—AN/BLA 4 SSEP	1.0
2–44—TUBA phase I	2.5
2–45—Support SSEP ancillary	1.4
2–49 AN/BRD–7 SSEP digital rec	12.3
2–51 Diamond (outboard)	*8.0
2–56 AN/BRD–6 improvement program	1.6
2–57 AN/WLR–6V improvement program	1.8
2–60 Infrared imaging system	.5
2–61 DOPTAR	3.2
2–65 CAESAR	71.8
2–66 ASW centers com and cont sys	7.2
2–96 Distance azimuth measuring equipment	1.2
2–100 OMEGA	*3.0
2–112 ASW communications	4.9
2–128 SECT	*4.5
3–1–4 Air-launched ordnance and support—ASW	80.8
3–30 Weapons ranges support equipment	*4.2
3–63 LAMPS equipment	2.6
4–10 Defense Atomic Support Agency	2.2
4–22 Fleet mine support	6.1
4–43–57 Ship-launched ordnance and related equipment—ASW	194.2
4–60 Miscellaneous training aids and devices	*.3
7–2 Dev. 7B1/1, SSEP stimulator	1.0
7–3 Dev. 21A40, Sub Attack Center	5.0
7–5 Dev. 14E23, AN/SQS–35 sonar cap., 14A2 Tr	.6
Total	527.4

*Portion of line item.

1972 Expenditures

Chairman Ellender. How much did you spend last year for the same effort?

Admiral Minter. May I make some reference to this, sir?

Chairman Ellender. You can do that for each category if you would.

Admiral Minter. I do not have it right here, but I can provide it for the record.

(The information follows:)

[In millions of dollars]

Category	Fiscal year— 1972	1973	Change
I. Antisubmarine warfare	497.1	527.4	+30.3
II. Expendable ordnance	291.9	279.1	−12.8
III. Antiship missile defense	90.3	181.4	+91.1
IV. Spares and repair parts	148.2	162.9	+14.7
V. Nuclear support	115.9	127.9	+12.0
VI. FBM/ULMS support	41.3	89.6	+48.3
VII. Aviation support	82.5	91.3	+8.8
VIII. Satellite communications	5.9	38.4	+32.5
IX. Environmental protection	1.9	8.1	+6.2
X. Ship alterations	280.2	278.0	−2.2
All other items	213.5	239.1	+25.6
Total	1,768.7	2,023.2	+254.5

MUNITIONS, TRAINING, AND SUPPORT

Admiral MINTER. This funding, essential to the development of a satisfactory ASW capability in the fleet, provides $275 million for ASW munitions and related equipment; $184.3 million for ASW improvements and training; $63.2 million for nuclear powered submarine (SSN) support, and $4.9 million for light airborne multipurpose systems (LAMPS). This request reflects the seriousness with which the Navy regards the ASW problem and the urgency of taking adequate corrective measures.

Major items in this request are:

	Million
MK 48 torpedo	$156.5
Sonobuoys	64.7
CAESAR	71.8
Improved TASS	15.7
AN/SQQ–23 sonar	25.4
ASW Centers Command and Control System	7.2
SSN support	63.2
LAMPS	4.9

MK–48 TORPEDO

Chairman ELLENDER. Before you proceed with your discussion of the MK–48 torpedo for which you are requesting $156.5 million, I would like to have included in the record at this point the weapons data sheet.

(The information follows:)

1973 PRESIDENT'S BUDGET ESTIMATE DATA SHEET

Service: Navy.
Nomenclature: Torpedo MK–48.
P–1 Line Item No. 45.
Popular Name: Torpedo MK–48.

Description/Mission:

The Torpedo MK–48 has been developed to replace all mods of the Torpedo MK–37 for the ASW role and the MK–14 and MK–16 Torpedo in the Anti-Ship role; thereby reducing to one the types of conventional (Non-Nuclear) Torpedoes which must be logistically supported. The MK–48 Torpedo Mod 1 is a dual purpose torpedo which entered full scale production with the FY 1972 procurement.

The Torpedo MK–48 possesses improved performance characteristics over previous torpedoes. This system will provide submarines with a large, high speed, deep running, acoustic homing torpedo which can be wire guided until it acquires the target acoustically. The Torpedo MK–48 is designed for use, in the ASW role, against all submarines (including fast, deep diving nuclears) using speeds up to [deleted] and capable of operating to depths of [deleted]; and, in the Anti-Ship role, against all surface ships. This torpedo, designed to counter the projected threat of the 1970–1980 era, uses advanced detection and classification techniques. Training, equipment is required to initially outfit schools.

Cost data (million dollars)	Fiscal year—								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Torpedo procurement:										
Quantity	153	[deleted]	[deleted]	[deleted]	[Deleted]					[deleted]
Cost	170.1	108.6	148.6	156.5						[1] 1,557.1
Procurement unit cost	1.112	[deleted]	[deleted]	[deleted]						[deleted]
Weapon systems cost	170.1	108.6	148.6	156.5						1,557.1
Initial spares	11.3	14.3	11.8	18.8						231.4
R.D.T. & E	254.2	41.6	17.1	7.0						325.7
Milcon	3.9	1.2	4.2	1.8						11.7
Program acquisition cost	439.5	165.7	181.7	184.1						[2] 2,125.9
Program unit cost										[deleted]
Program additional cost										

[1] Includes 60 mod 0/2 and 40 mod 1 production prototypes and funding. Does not include 20 mod 1 or 25 mod 0/2 R. & D. units.

[2] Excludes elements of the MK-48 torpedo weapon system which are covered elsewhere in the special authorization. These are: MK-48 fire control and launcher, MK-27 torpedo target and initial spares for both.

Basis for 1973 budget request.—The FY 1973 funding request is based on phased procurement to attain the inventory objective with delivery of the FY [deleted] buy. The inventory objective is based on providing an initial shipfill plus additional quantities required to support combat usage rates.

Test Data

Start of DPT in-water tests MOD–1, April 1969.
Start of PPT in-water tests MOD–1, July 1970.
Start of TECH/OPEVAL, August 1970.
Start of Selection Test Program (STP), September 1970.
Completion of STP, June 1971.
Completion of OPEVAL on selected weapon, March 1972.

Contract Data

Major Subsystem.—Torpedo MK–48.
Contractor.—Gould, Inc., Clevite Ocean Systems Division.
Type of last contract.—Fixed Price Incentive.

	Class	Operational requirement	
		[Deleted]	Demonstrated
Performance:			
Range (MAX)	C	[Deleted.]	
Acoustic detection range (yards):			
Active	C		
Passive	C		
Maximum torp wire guidance range (yards)	C		
Operating depth (feet)	C		
Speed (knots)	C		
Characteristics:			
Engine horsepower/fuel	C		[Deleted] Otto fuel
Length			19.2 feet
Diameter			21 inches
Weight combat loaded			3,600 pounds.
Warhead charge weight (pounds)	C		[Deleted] pounds
With [deleted]	C		[Deleted] pounds

COST HISTORY COMPARISON

[Dollar amount in millions]

	Quantity	Amount
Initial planning estimate:		
Procurement	[Deleted]	1,656.6
R.D.T. & E.	20	97.2
Milcon		
Total program costs		1,753.8
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	[Deleted]	2,122.0
R.D.T. & E.	45	338.4
Milcon		10.5
Total program costs		2,470.9
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	[Deleted]	1,788.5
R.D.T. & E.	45	325.7
Milcon		11.7
Total program costs		2,125.9

RDT&E reduction of $12.7 is due to $3.9 million reduction resulting from program realignment in fiscal year 1971; $.8 cost to program for close out cost and pay raises; $4.0 million reduction in FY 1972 and FY 1973 respectively.

Procurement Variance (—)333.5 million.—FY 1972 Budget Submission was based on the estimates of procurement costs at that time. On 2 July 1971, the Mod 1 Torpedo was selected and a definitized major production contract was awarded. The FY 1973 submission reflects projections of the negotiated prices.

Increase in MILCON due to revision of estimates and addition of a Torpedo Maintenance Facility at NWS Yorktown, Va.

Admiral MINTER. A major advance in the effectiveness of our submarine force is being achieved with the procurement of the MK–48 torpedo. Last July, a production contract was awarded Gould for [deleted] torpedoes, funded out of a combination of fiscal years 1970, 1971, and 1972 funds. The contract also contains an option to be exercised in fiscal year 1973 for another [deleted] torpedoes.

Since the MK–48 was developed as a dual-purpose torpedo, to destroy either surface ships or submarines, the cost of a separate anti-shipping torpedo development was not incurred.

Senator YOUNG. Has this torpedo demonstrated its capability to perform both the ASW role and the anti-ship role?

Admiral HALVORSON. Yes, sir. The MK–48 torpedo has demonstrated its capability against surface ships and against both real and simulated submarine targets.

Admiral MINTER. We are meeting our schedule with the load-out of operational warshot torpedoes in the nuclear submarine *Bergall.* By the end of this calendar year, we expect a total of [deleted] submarines to be equipped with operational torpedoes, with about [deleted] more submarines to be equipped in calendar year 1973. The fiscal year 1973 buy, $156.5 million, will permit attainment of [deleted] of our MK–48 inventory objective for the submarine force in 1974.

Chairman ELLENDER. Admiral, that is quite a large unit cost. What makes that torpedo so expensive?

Admiral MINTER. It is a sophisticated weapon. It is an undersea missile. It is capable of [deleted] knots so it can catch any submarine.

Chairman ELLENDER. How is it guided?

Admiral MINTER. It has an acoustic homing device. It is wire-guided from the parent submarine for the first part of the shot. Admiral Armstrong is an expert, and can tell you more about it.

Last night when we were here talking about this torpedo we were talking in terms of a higher unit cost. This has come down in unit cost this year. I think the program is in good shape.

Chairman ELLENDER. If you directed it at a submarine——

Admiral MINTER. When it gets within acoustic range, then it homes in on the noise provided by the ship or the submarine. That is the way it achieves the final guidance.

Chairman ELLENDER. But you guide it up to the point where it picks up the noise on ships?

Admiral MINTER. Yes, sir. It is a tremendously advanced weapon, Mr. Chairman.

TEST PROGRAM

Chairman ELLENDER. What success have you had on testing the Mark–48?

Admiral MINTER. There has been a very extensive test program throughout this past year. When we were here last year, you expressed concern about us buying this system before it was tested. We told you we expected to continue the testing and make our choice of which companies would get the contracts.

The tests were satisfactory and a large number of them have been held.

PRODUCTION BUY

Chairman ELLENDER. Your first order buy was in fiscal year 1972?

Admiral MINTER. Yes, sir. This is the second production order we are talking about now. The 1973 buy. It is a follow-on of the 1972 buy which was the first production buy.

Chairman ELLENDER. Do you expend torpedoes on test shots?

Admiral MINTER. No, sir, we have not expended them. These are recoverable for test shots. You do not have to destroy the weapon in a test shot. You can do your test with it and recover the weapon. This first submarine we have spoken to here is the first one to be equipped with this weapon.

We are now starting to put this weapon aboard our attack submarines. This buy will help us continue to outfit our other submarines.

SUBMARINE MODIFICATION

Chairman ELLENDER. To what extent must you alter the submarines to give the Mark-48 capability?

Admiral MINTER. They have to have a fire control system to accommodate to this.

Could you speak to this?

Admiral ARMSTRONG. I am the project manager for all ASW systems. The submarine that will get the Mark 48 torpedoes, all have been modified both for launching tubes, torpedo tubes and fire control systems for the Mark 48 torpedo as of right now.

The production buy that Admiral Minter is referring to, the one that we used the 1972 money for, will have its first delivery of production torpedoes this fall. And they were let on a multiyear contract with Gould in July of last year.

UTILIZATION OF REPLACED TORPEDOES

Chairman ELLENDER. Do you have any use for the torpedoes the Mark 48 would replace?

Admiral ARMSTRONG. It replaces three torpedoes, Mark 14, Mark 16, which are antisubmarine torpedoes of World War II vintage. It also replaces the Mark 37 wire-guided torpedo which is an antiship torpedo. These torpedoes are being reduced in number in our inventory by virtue of exercise shots, et cetera, for training, and by the time that the full Mark 48 program is phased in, which is some [deleted] torpedoes here in [deleted] we will have phased out all of the old torpedoes. So we are making a quantum jump from World War II technology and capability to the Mark 48 torpedo.

TORPEDO CAPABILITY

Chairman ELLENDER. It is your estimate that this torpedo will prove a satisfactory improvement over those now in use?

Admiral ARMSTRONG. Yes, sir; the main area that we are interested in continuing R. & D. is quieting this torpedo. It really is noisy but we consider it will be effective for many years to come particularly because of its speed and depth, [deleted] knots, [deleted] foot depth. As far as we can look at the submarine of the Soviet fleet, this should be effective for some time.

SUBMARINE DETECTION

Chairman ELLENDER. You mentioned a new submarine detection system, the tow array program. Is this an application of sonar?

Admiral ARMSTRONG. Yes, sir. Admiral Minter alluded to the tow array program, which is part of this appropriation, which is a passive tow array, Senator. It can be towed [deleted] which we feel is an advantage in our detection capability, along with the hull mounted active systems and the variable depth [deleted].

Chairman ELLENDER. You indicated earlier you were requesting $156.5 million for the procurement of [deleted] of these torpedoes. As I understand the data sheet, this total is only for the actual procurement of the torpedoes and does not include the $18.8 million requested for initial spares. Am I correct?

Admiral HALVORSON. Yes, sir; you are correct.

Chairman ELLENDER. I note on the data sheet that $7 million is requested in the R. & D. appropriation for the continuation of the MK–48 program. Generally speaking, just what will be done in the R. & D. program during fiscal year 1973?

Admiral HALVORSON. The $7 million in fiscal year 1973 will be utilized to maintain the superiority of the MK–48 in future years against an improving Soviet SSN capability. We are concentrating on [deleted].

Chairman ELLENDER. I also note a request of $1.8 million under the military construction appropriation and that $9.3 million was made available in prior years under the military construction appropriation. What is the nature of the facilities built with these funds?

Admiral HALVORSON. The total MILCON investment is $11.1 million. It is for the construction of new structures and additions to others for the torpedo maintenance shops at nine activities and torpedo magazines at two activities.

Senator YOUNG. I call your attention to the performance data on page 2 of the data sheet. As I read this tabulation, all of the performance requirements for this torpedo have been demonstrated, with one minor exception. Am I reading this data correctly?

Admiral HALVORSON. Yes, sir; you are reading it correctly. The performance exception is for radiated noise.

Senator YOUNG. As stated earlier, the 1972 buy was the initial operational buy of this torpedo. When do we expect this torpedo to become operational in the fleet?

Admiral HALVORSON. Initial deployment of the MK–48 Mod 1 Torpedo occurred on February 27, 1972 in the U.S.S. *Bergall* (SSN 667) in the Atlantic Fleet. By the end of calendar year 1972 [deleted] additional submarines will be out-fitted. It is expected that the number will grow to [deleted] additional submarines per year in calendar years 1973 and 1974.

Senator YOUNG. On page 4 of the data sheet, under the cost history comparison information, I note that the initial planning for this torpedo was approximately $1.8 billion and that the current estimate is about $2.1 billion. What was the date of the initial planning estimates?

Admiral HALVORSON. The figures cited on page 4 of the data sheet are an extract of the torpedo portions of the December 31, 1971 selected acquisition report (SAR). The baseline for computing these

initial planning estimates is in accord with SAR instructions. In this case, the initial estimate represents a combination of the initial TDP for a single purpose ASW weapon (June 1964); the additive requirement for development and acquisition of a dual purpose ASW/antisurface weapon (April 1969); and finally, the initial program estimates associated with acquisition of the selected weapon MK–48 Mod 1 (July 1971).

GAO REPORT

Chairman ELLENDER. In a 1970 report to the Congress on the MK–48 program by General Accounting Office, it was stated, "As of June 30, 1969, the total estimated program cost, as reported in the Navy's SAR, will increase from about $682 million to a $3.9 billion, a cost increase of about $3.2 billion." How does the $682 million cited in this report differ from the initial planning estimate of $1.8 billion cited in the data sheet?

Admiral HALVORSON. The $682 million Planning Estimate in the June 30, 1969 report was for the weapon system, including only the Mark 48 Mod 0 Torpedo, as originally estimated in 1964. Under Department of Defense regulations governing selected acquisitions report submission, this "planning estimate" has been updated to reflect the 1969 estimates for development and testing of the Mark 48 Mod 1 Torpedo in lieu of Mark 48 Mod 0 Torpedo estimates (while retaining the original 1964 planning estimates for the other elements of the weapon system) and the 1971 revised estimates of Mark 48 Mod 1 procurement costs developed incident to selection of the Mark 48 Mod 1 production and the attendant change in status of the torpedo portion of the program from "engineering development" to full-scale "production."

SONOBUOYS

Admiral MINTER. The major funding allocated to sonobuoy procurement, $64.7 million in the fiscal year 1973 request, contributes both to advancing the usefulness of our major investment in ASW aircraft, and to maintaining a continually combat-ready posture in the Navy's ASW air arm. The fiscal year 1973 procurement will include buoys of advanced capability, such as TASS and DIFAR, providing the expendable units which are used with the advanced airborne equipments in such aircraft as the P3C and the S3. These funds provide for a modest inventory buildup of all models of sonobuoys, and for their consumption in training and surveillance operations at sea.

In ASW modernization, the requested funding provides for procurement of improved weapon systems, sensors and other equipment which prolong the ASW combat effectiveness of existing platform and surveillance systems.

Chairman ELLENDER. The $64.7 million you are now discussing for the procurement of sonobuoys is set out as line 1 of budget activity 3 of the P–1 exhibit. Is this correct?

Admiral MINTER. That is correct, Mr. Chairman.

Chairman ELLENDER. It is my understanding that the $64.7 million is for the procurement of six different types of sonobuoys. I wish you would provide for the record a statement describing each of these dif-

ferent types of sonobuoys, explaining how they are used and the amount included in the estimate for the procurement of each and the number of each that you plan to procure in fiscal year 1973.

Admiral ARMSTRONG. Yes, sir; I would be happy to do so.

(The information follows:)

[Dollar amount in millions]

Type	Quantity	Amount
AN/SSQ-41 Jezebel passive	[Deleted]	$15.9
AN/SSQ-57 Calibrated sonobuoy		.7
AN/SSQ-53 directional passive		24.5
AN/SSQ-47 active sonobuoy		2.5
AN/SSQ-50 command active sonobuoy		14.6
AN/SSQ-36 bathythermograph		1.7
Production support		4.8
Total		64.7

Further explanation of each sonobuoy type is as follows:

(a) The SSQ-41 is an omni-directional passive sonobuoy used principally for large area search. [Deleted].

Users consists of fixed wing aircraft S-2, S-3, P-2, P-3; helicopters SH-2 and SH-3 series.

b. The SSQ-57 is a specially calibrated passive buoy [deleted]. No inventory levels are established and procurement quantities are predicated solely on planned usage rates.

c. The SSQ-53 (DIFAR) is an improved passive sonobuoy which provides the direction and frequency characteristics of the target. [Deleted.] User aircraft are the P-3C, P-3A, P-3B, S-2G and will include the S-3A when it is introduced into the Ffeet.

d. The SSQ-47 is an active echo-ranging sonobuoy with a self contained sonar which provides non-directional target range information to the ASW aircraft during localization and attack of submerged submarines. User aircraft include the S-2, P-2, P-3A, P-3B, P-3C, S-3A, SH-2D and SH-3 series.

e. The SSQ-50 is a command-active sonobuoy which operates only upon command from the attack aircraft. [Deleted.]

f. The SSQ-36 Bathythermograph is an air-dropped sonobuoy that is used to provide a water temperature profile from the surface to a depth of [deleted] feet. This data is relayed to the ASW aircraft to aid the crew in selection of optimum hydrophone depths and tactics to be utilized. Information on ambient water conditions is also used to provide oceanographic data.

Chairman ELLENDER. During the course of a year, how many of these sonobuoys will you use, and how does that break down between training and actual operations?

Admiral ARMSTRONG. I would be happy to provide for the record a table showing usage rate and a breakdown between training and actual operations.

(The information follows:)

During the delivery period of the FY 1973 buy, the following sonobuoy consumption is predicted.

(A classified tabulation was furnished to the committee.)

UNDERSEAS SURVEILLANCE

Armiral ARMSTRONG. The fiscal year 1973 ASW budget provides for two undersea surveillance systems which are expected to make a major contribution to the Navy's ASW posture in the 1970's and beyond.

CAESAR

The first of these is the Caesar program, where $71.8 million is requested in the fiscal year 1973 budget. A major decision to expand and improve the Caesar system has been in staffing in the Department of Defense for over a year, and is now reflected in both fiscal years 1972 and 1973. The urgency of this program necessitates a $42.5 million fiscal year 1972 reprograming action to permit reaching the required obligational authority of $88.9 million. This action reflects a significant reordering of priorities by the Chief of Naval Operations to accommodate this program. Whereas funding to date has supported the effort necessary to procure [deleted] the new program [deleted] using fiscal years 1972 and 1973 funds [deleted].

Chairman ELLENDER. Is this $71.8 million the item set out on line 65 of budget activity 2 of the P–1 exhibit?

Admiral ARMSTRONG. Yes, Mr. Chairman; that is correct.

TOWED ARRAY SURVEILLANCE SYSTEM

Admiral MINTER. The second major advance in ASW surveillance is the improved towed array surveillance system (TASS), for which $15.7 million is requested in fiscal year 1973. Three early models of the system, which have been in use for over a year, [deleted] have produced encouraging results. This experience together with other test programs are convincing arguments that TASS offers one of the most promising solutions to the problem [deleted]. This consensus requires that the Navy program [deleted]. The purpose of accelerating the acquisition of these systems is to gain experience and operational data under a variety of environmental conditions, and to be able to provide a near-term surveillance capability [deleted].

Chairman ELLENDER. Is this $15.7 million requested for the towed array surveillance system the items set out as line 34 of budget activity 2 of the P–1 Exhibit?

Admiral ARMSTRONG. Yes, sir.

Senator YOUNG. What types of ships are these systems operated from?

Admiral ARMSTRONG. Destroyer escort platforms are in use for the [deleted] systems currently operational [deleted]. While specific ships classes have not been identified, destroyer escorts, minesweepers, destroyers, landing ships, and oceanographic research vessels, as well as other available platforms, are being considered for installation of the fiscal year 1972 and fiscal year 1973 procurement. Identification of specific platforms will be made upon completion of cost and feasibility studies which are currently underway.

Chairman ELLENDER. What additional capability do you obtain from this TASS system that is not available from the existing surveillance systems on these ships?

Admiral ARMSTRONG. To answer your question, Mr. Chairman, I must first clarify some definitions. Current surface ships do not have [deleted] surveillance systems but do have acoustic tactical sensors which provide an in-close force and self-protection capability. These same ships also have passive and active electromagnetic surveillance capabilities for missile and air defense. The [deleted] (TASS) will

provide [deleted] capability for ships [deleted]. Thus, the TASS provides a new [deleted] capability for surface ships that currently does not exist.

The fiscal year 1973 request for $25.4 million for AN/SQQ–23 (PAIR) sonar retrofit is an excellent example of ASW improvement. By combining improved operational characteristics with major advances in reliability, maintainability, and a better understanding of the oceanographic parameters affecting ASW, this retrofit is insuring the continued effectiveness of major investment in older high value escorts by giving them a sonar for the 1970's. The competitive multiyear procurement price negotiated early in 1971 permits the fiscal year 1973 increment to be procured at approximately $15 million less than was estimated a year ago.

Chairman ELLENDER. Is this $25.4 million for the retrofit of these existing sonars the item set out in line 29 of budget activity 2 of the P–1 exhibit?

Admiral ARMSTRONG. Yes, sir.

Chairman ELLENDER. I note the cost of the retrofit for each of these sonar systems is approximately $1.4 million. Comment on the additional capabilities you obtain through this retrofit program.

Admiral ARMSTRONG. The PAIR retrofit provides simultaneous search and track operation in both the active and passive modes against multiple targets and automatic performance monitoring, fault localization. However, I would be happy to provide for the record a comparative table of performance improvements gained by the PAIR retrofit.

(The information follows:)

PAIR PERFORMANCE IMPROVEMENTS

	Units of measure	Tram	Pair
1. Active detection range: [Deleted]	KYD	[Deleted.]	
2. Passive detection range: [Deleted]	KYD		
3. [Deleted] Torpedo Detection [deleted]	KYD		
4. Classification:			
Sub as sub	Percent		
Nonsub as sub	do		
5. Track:			
Bearing error	Degree		
Range error	Percent		
6. Self-noise level spectrum level	DB		
7. Source level	DB		
8. Reliability (MTBF)	Hours		
9. Maintainability (MTTR)	do		

Chairman ELLENDER. What types of ships are these particular sonar systems deployed on?

Admiral ARMSTRONG. This sonar system will be deployed on guided missile cruisers, destroyers, guided missile destroyers, and guided missile frigates.

Chairman ELLENDER. I note that three of these retrofits were funded in fiscal year 1971, 16 in fiscal year 1972, and you are requesting 18 for 1973. How many of these sonar systems do you plan to retrofit, and what is the total estimated cost of this retrofit program?

Admiral ARMSTRONG. A total production procurement of [deleted] AN/SQQ–23 sonar systems is planned through fiscal year 1975 at a total estimated procurement cost of $96.4 million.

Chairman ELLENDER. How long is the ship out of commission when you are doing this retrofit work?

Admiral ARMSTRONG. The AN/SQQ–23 PAIR retrofit will be accomplished concurrently with other authorized work during regular overhaul or conversion of the ships involved. Specifically, 4½ months is required for the PAIR retrofit. Shipyard availabilities range from 4½ months for regular overhauls to 12 months for conversions.

ASW CENTERS COMMAND AND CONTROL SYSTEMS

I might mention this is to be procured at approximately $15 million less than was estimated a year ago.

The $7.2 million requested in fiscal year 1973 for the ASW centers command and control system is intended primarily to replace a rudimentary capability developed several years ago at the Norfolk headquarters of the commander, ASW Forces, Atlantic Fleet. The new system is planned for maximum economy through the sharing of facilities already in existence or procured essentially for independent purposes. An extended R. & D. program has contributed to the careful design and optimized planning for this system. The Atlantic network will keep the ASW Force commander up to date on operational developments at all the principal ASW bases in the North Atlantic, and enable him to direct the optimum use of available forces in time of crises or combat. [Deleted.]

Senator YOUNG. Is this $7.2 million you are requesting for ASW centers command and control systems, the item set out on line 66 of budget activity 2 of the P–1 exhibit?

Admiral ARMSTRONG. Yes, sir; that is correct.

Chairman ELLENDER. How much of this $7.2 million is for the modernization of the Atlantic Fleet facility at Norfolk, and how much is for each of the other two facilities?

Admiral ARMSTRONG. The term "modernization" could be somewhat misleading, Mr. Chairman. The funds requested here will procure the basic data processing, communications, and display equipment for the ASW command and control function in the entire Atlantic Fleet system, including the satellite terminals, at a cost of $5.2 million. For the Mediterranean system, its equipment cost is estimated at $1.4 million. Each of these will have a complete system. For the Pacific area we are providing for a communications upgrading at an estimated cost of $0.6 million.

Chairman ELLENDER. Is this $7.2 million you are requesting for fiscal year 1973 the total estimated cost of the modernization of these facilities?

Admiral ARMSTRONG. The fiscal year 1973 request for $7.2 million covers the complete cost of the current Atlantic and Mediterranean systems plus a basic increment of the full system planned for the Pacific. The Pacific area will require additional funds in the fiscal year 1974 budget to provide a capability comparable to that in the Atlantic. Like the other systems, the Pacific system will tie into the worldwide military command control system. Minor incremental additions to the system, phased to correspond with related improvements in other ASW capabilities, are being favorably considered. If approved, these would be funded in fiscal year 1975 at a cost of about $1 million.

SSN SUPPORT

The $63.2 million requested in fiscal year 1973 for nuclear powered submarines support continuation of those ongoing efforts required to ensure our attack submarines retain their present qualitative superiority over the surface and subsurface threat. Included is $11.9 million for submarine silencing and acoustic sensor improvements, which will permit our attack submarines to operate covertly and, if required, to successfully engage enemy submarines or surface ships in the threat environment; $30.1 million is requested for optical and electromagnetic sensor improvements [deleted]. Navigation system improvements and procurement of integrated communications equipments amounting to $16.2 million, are requested to enhance attack submarine operations in all ASW missions [deleted].

Chairman ELLENDER. Please provide a tabulation for the record identifying each of the items in the request of $63.2 million for nuclear attack submarine support by line number and budget activity in the P–1 exhibit.

Admiral MOORE. Yes, sir, I will be glad to.

(The information follows:)

[Dollars in millions]

BA–LI:	*Fiscal year 1973*
1–1 Submarine batteries	*$2.1
1–10 Damped propeller	2.2
1–16 Submarine silencing equip	*3.0
1–18 SINS system mods	*1.8
1–19 Periscope type 18	5.0
1–20 Type 15 periscope Imp	1.5
1–40 300 KW motor generator	.7
2–15 Integ comm antenna sub syst	*5.1
2–25 Training equip. SSN688CL	1.8
2–42 WLR 6 freq ext kits SSEP	4.0
2–43 BLA–4 SSEP	1.0
2–44 Tuba phase I	2.5
2–45 Support SSEP ancillary	1.4
2–49 BRD 7 SSEP digital rece	12.3
2–56 BRD 6 impr program	1.6
2–57 WLR 6V impr program	1.8
2–60 IR Imaging system	.5
2–61 DOPTAR	3.2
2–100 OMEGA	*3.0
2–128 SECT	*4.5
4–10 Defense atomic support agency	2.2
7–1 SSEP stimulator	1.0
7–3 Sub-Attack center trainer	1.0
Total	63.2

*Portion of line item related to SS/SSN program.

LIGHT AIRBORNE MULTIPURPOSE SYSTEMS (LAMPS)

Admiral MINTER. The Navy's concern for extending the ocean escort's early warning and fighting capability resulted in acceleration of the Light Airborne Multi-Purpose System (LAMPS) weapons system using manned helicopters. $4.9 million is requested in fiscal year 1973.

Chairman ELLENDER. Those helicopters will be used how?

Admiral MINTER. For smaller ships, escort type ships.

Chairman ELLENDER. Do you propose to equip most of these ships?

Admiral MINTER. Most of our escort types will, or the majority of them will have the LAMPS equipment in the future years, as we develop this system.

The Patrol Frigate, for example, that is in this year's shipbuilding request—it is a new type ship that special hearings have been held on by Senator Stennis and his committee. Those ships when we get them (they are several years off) will carry the LAMPS helicopter as one of their systems.

Admiral SONENSHEIN. Of the ships in the service now, 20 will be LAMPS equipped by the end of fiscal year 1972 and 20 more are scheduled for modification in the 1973 program.

FUNCTIONS OF HELICOPTER

Chairman ELLENDER. Will the helicopters perform any function other than to help locate the target?

Admiral MINTER. Yes, sir; these helicopters are going to have two functions in life. They are going to have an Anti-Submarine Warfare function in which they will assist in locating submarines, and they will also be part of the Anti-Ship Missile Defense system. This will be another part of their mission, to attempt to detect incoming missiles at some distance from our ships. It will have two missions, this helicopter.

Chairman ELLENDER. Through the use of instrumentations?

Admiral MINTER. Yes, sir.

Senator YOUNG. Isn't this a two-phase program? You start by using your present helicopters and then you will move into a second phase?

Admiral MINTER. That is correct.

Senator YOUNG. When will you get into procurement of the more advanced helicopters?

Admiral CLANCY. I don't think there is one on the boards yet, Senator. At least for the immediate future, we are going to use the H–2 helicopter which is in our inventory already.

RESEARCH AND DEVELOPMENT FUNDING

Senator YOUNG. Do you have research and development money for a new helicopter?

FOLLOW-ON HELICOPTER

Admiral MINTER. Captain Woodbury has been associated with the LAMPS program. He can speak to the total plan.

Captain WOODBURY. In regard to your first question, "Do we have a follow-on helicopter?" We will begin in [deleted] fiscal year [deleted] with some long lead money for procurement of a follow-on helicopter from existing off-the-shelf helicopters such as UH–1's, Sikorsky helicopters or even foreign helicopters for delivery in fiscal year [deleted]. That is the follow-on helicopter program that you asked about.

The second question is about an R. & D. program; yes, sir, we have an R. & D. program for the development of a sensor suite to go into that follow-on helicopter. That is supposed to come to fruition about [deleted].

Senator YOUNG. How much money are you requesting?

Admiral MINTER. We better provide that for the record.

Captain WOODBURY. I am quite sure there is $20.7 million in the R.D.T. & E. request for 1973.

Senator YOUNG. You can correct that, if your figures are wrong.

Chairman ELLENDER. You indicated that this appropriation has $4.9 million for the procurement of equipment to support the LAMPS program. Please identify each of the items included in this $4.9 million in the P–1 exhibit.

Admiral MINTER. They are LAMPS hangar extension mods at $1.1 million; DAMES at $1.2 million; and LAMPS equipment at $2.6 million.

Chariman ELLENDER. I wish you would provide for the record a tabulation identifying all the funds for the LAMPS program by line number in the P–1 exhibit, and indicate the amounts for fiscal years 1972 and 1973.

Admiral MINTER. Yes, sir.

(The information follows:)

[Dollars in millions]

BA—LI		Fiscal year 1972	Fiscal year 1973
1—45	Lamps hanger ext. mods	$1.4	$1.1
2—96	Dames	1.5	1.2
3—63	Lamps equipment	1.8	2.6
	Total	4.7	4.9

Senator YOUNG. It is my understanding that the current program calls for the modification of 50 of these helicopters to the LAMPS configuration. Is my information correct?

Admiral CLANCY. The initial fiscal year 1973 procurement of aircraft and missiles, Navy budget submission envisioned a fiscal year 1973 program quantity of 30 aircraft which, when added to the 20 aircraft procured in fiscal years 1971 and 1972, would have totaled 50 aircraft through fiscal year 1973. Funds for an additional [deleted] aircraft modifications were to be requested beyond fiscal year 1973, bringing the total to [deleted] aircraft.

The House Appropriations Committee denied our reprograming request for fiscal year 1972 advance procurement funds for fiscal year 1973 aircraft.

As a result, the Navy can only modify 22 helicopters instead of 30 helicopters with the $32.2 million requested in fiscal year 1973. When added to 20 helicopter modifications in fiscal years 1971 and 1972, the total quantity of modifications currently programed through fiscal year 1973 is 42. Funds for an additional [deleted] aircraft modifications are planned for fiscal years 1974 through 1976 which would bring the total modification program to [deleted].

Chairman ELLENDER. What is the estimated cost of this total helicopter modification program, and what is the unit cost for the modifications in the fiscal year 1971 program, the 1972 and the 1973 programs?

Admiral CLANCY. The total cost of the helicopter modification program to be financed by the procurement of aircraft and missiles, Navy appropriation is estimated at $115.2 million. This includes those modifications planned from fiscal year 1971 through fiscal year 1976.

The unit cost for the 10 modifications in the fiscal year 1971 program is $862,000. This includes nonrecurring and some support costs and excludes $740,000 of fiscal year 1971 advance procurement funding.

The unit cost of the 10 modifications of an improved configuration in the fiscal year 1972 program is $1,487,000. This estimate includes prior year advance procurement, nonrecurring engineering costs and support.

The fiscal year 1973 modification request is $32.2 million: $2.8 million of the amount requested is for modification of 10 "AUSTERE" LAMPS at an average unit cost of $284,000; $13.1 million is requested for 12 improved LAMPS of the same configuration as procured in fiscal year 1972 at an estimated unit cost of $1,092,000. The residual $16.2 million in the fiscal year 1973 request is for advance procurement of long leadtime material required for fiscal year 1974 modifications.

Senator YOUNG. How long do you expect these modified helicopters to remain in operation?

Admiral CLANCY. We can expect the modified SH–2D LAMPS helicopter to remain in an operational status for at least 9 more years.

Senator YOUNG. Will all of these modified LAMPS helicopters be replaced by the new destroyer helicopter system now under development?

Admiral CLANCY. No; the new LAMPS helicopters will be deployed in conjunction with the modified LAMPS helicopters. The total required LAMPS inventory will be composed of both modified existing H–2 helicopters and new production helicopters.

Chairman ELLENDER. When do you expect this new helicopter system to be operational?

Admiral CLANCY. The Navy has a requirement for new LAMPS helicopters in fiscal year [deleted]. However, the Navy's proposed plan for a new LAMPS does not yet have the approval of the Department of Defense.

EXPENDABLE ORDNANCE

Admiral MINTER. The fiscal year 1973 request of $279.1 million provides for the procurement of all expendable ordnance used by naval forces, except for guided missiles and the ASW munitions already covered in the ASW program. It provides for Navy and Marine Corps air launched ordnance (less guided missiles) and ship gun and ground ammunition used by Navy Forces.

Chairman ELLENDER. Will you compare this year's request with last year's?

Admiral MINTER. The 1972 figure was $291.9 million and the 1973 figure is $279.1 million. This is a reduction.

Chairman ELLENDER. Continue.

Admiral MINTER. Major items in this request are:

	Million
Air munitions	$224.4
Ship gun ammunition	49.5
Ground munitions	5.2

A brief description of each follows:

AIR MUNITIONS

The fiscal year 1973 air munitions program of $224.4 million, together with assets from prior year programs, will provide for planned Southeast Asia consumption, world-wide training consumption and achieve [deleted] of the war reserve requirements. The procurement plan provides for maintenance of an air munition production base, that can

be expanded rapidly, should the need arise. We are programing to attain a more sophisticated and effective air munitions inventory designed to take advantage of the increased capability of our more advanced tactical aircraft. By increasing the effectiveness of our air munitions we can reduce the number of sorties required to destroy a target. This modernization program calls for new munitions significantly more capable of target destruction. For example, the fiscal year 1973 budget request contains $32.1 million to procure Rockeye, a specially designed cluster bomb which greatly increases our air-delivered [deleted] capability. [Deleted.] The fiscal year 1973 budget also requests $8.7 million for laser guided bomb kits which will improve bomb delivery accuracy, and be more effective than free fall bombs for specific hard-to-hit targets. We are continuing the Walleye II configurations by modifying an additional [deleted] TV guided Walleye I weapons. Also we are doubling ($1.3 million in fiscal year 1973) the airborne expendable countermeasures procurement.

Chairman ELLENDER. Will you please provide a tabulation for the record identifying each of the items in your request for expendable ordnance by line number.

Admiral CLANCY. I will be glad to do so.

(The information follows:)

AIR LAUNCHED ORDNANCE AND SUPPORT EQUIPMENT

[Dollars in millions]

Item	Amount	P-1 line number
General and special purpose bombs:		
Walleye	$12.3	5
MK-82 500 pound G.P. bomb	60.8	6
MK-83 1,000 pound G.P. bomb	6.1	7
MK-84 2,000 pound G.P. bomb	2.4	8
Cluster bomb MK-20 (Rockeye)	32.1	9
Firebomb MK-77	4.7	11
Cluster bomb CBU-55/B (FAE)	11.9	12
Subtotal	130.3	
Air launched rockets:		
ZUNI rocket	35.0	17
2.75-inch rocket	20.4	18
Subtotal	55.4	
Aircraft gun ammunition:		
20mm. service ammo	3.6	19
20mm. practice ammo	6.3	20
30mm. service ammo	.9	21
30mm. practice ammo	.8	22
Subtotal	11.6	
Miscellaneous ordnance and support:		
Practice bomb MK-76	4.9	13
Practice bomb MK-87	1.5	14
Defense nuclear agency (DNA) material	.9	16
Aircraft ammo loading	.5	23
Marine location market	1.2	24
Miscellaneous air delivered pyrotechnics	.4	25
Miscellaneous cartridges, CAD's and ROCAT's	7.7	26
ADR-8A chaff rocket	1.0	27
First destination transportation	6.5	28
Miscellaneous items air launched ordnance and support equipment	1.2	29
Subtotal	25.8	
Total air launched ordnance and support equipment	223.1	
Airborne expandable countermeasure	1.3	60
Total expandable ordnance	224.4	

Senator YOUNG. As I understand the P–1 exhibit, the $224.4 million requested for air munitions is made up of a total of $223.1 million for those items in budget activity 3 listed in line numbers 5 through 29 of the P–1 exhibit and the $1.3 million listed in line 60 of the P–1 exhibit for airborne expendable countermeasures. Is this correct?

Admiral MINTER. Yes, sir.

Senator YOUNG. Does the request for $224.4 million for air munitions include funds for any items that have not been procured in prior fiscal years, and if so, please comment on these new items.

Admiral CLANCY. There are no new line items in fiscal year 1973, however, the fiscal year 1973 request includes funds for the MK–84 bomb and the marine location marker, items for which funds have not been requested in either of the previous 2 years. The fiscal year 1973 miscellaneous cartridges, CAD's and ROCAT's program, though not a new line item, does include, for the first time funds for the procurement of CAD's for the F–14 and S–3 aircraft. Also, a portion of the Walleye request is for an improved version with the extended range and data link modification.

Chairman ELLENDER. You indicated that you are requesting $8.7 million for laser guided bomb kits. Could you identify this item in the P–1 exhibit, and give us a brief description of this item and indicate the aircraft which will have the capability to use this new item?

Admiral CLANCY. The $8.7 million for procurement of the laser-guided bomb kits is included in the MK–82 line item, P–1 item 6. The kit, when attached to a MK–82 low drag general purpose bomb, enables the bomb to home on reflected laser energy. Present missions involve strike aircraft delivering the weapons and a ground or airborne laser designator illuminating the desired target. The Navy is currently using the A–4, A–6, A–7 and F–4 aircraft to deliver the weapons.

Senator YOUNG. You referred to the continuation of the program to modify the Walleye I TV-guided glide weapon to the Walleye II configuration for which you are requesting $12.3 million. Briefly, what is involved in this modification program?

Admiral MINTER. The modification of Walleye I to the Walleye II configuration essentially is a conversion program to provide Walleye with a [deleted] pound class warhead vice a [deleted] pound class warhead. The conversion consists of procuring and providing the new warheads, and larger wings and fins to provide the necessary aerodynamic glide ratio. The guidance sections, control sections, and fuzes are provided from current Walleye inventory but do receive the necessary up-dating configuration improvements to enable Walleye II to perform to design requirements.

This conversion program was initially funded in fiscal year 1971 and $12.3 million in fiscal year 1973 will convert an additional [deleted] Walleye I weapons to the larger warhead configuration. Included in the $12.3 million is $1.6 million for the introduction of extended range and data link improvements to [deleted] of the converted weapons. The extended range and data link improvements will provide a capability for launching the weapon from a greater range, thereby eluding enemy defenses. The limited buy of [deleted] in fiscal year 1973 will provide production-type weapons for naval technical evaluation (NTE) and operational evaluation (Opeval).

Chairman ELLENDER. I note on page 3 of the justification that, of the total number of Walleye is to be modified, [deleted] will be provided with a [deleted] and larger wings and fins. As I recall, Congress disallowed the funds you requested for this effort last year. Am I correct about this?

Admiral MINTER. Yes, sir.

Senator YOUNG. It is my understanding that these [deleted] Walleye II's with the extended range are to be used for technical and operational evaluation. Is this correct, and if so why is this being done with procurement funds rather than R. & D. funds?

Admiral MINTER. Yes, sir; you are correct. The extended range data link Walleye II was developed with fiscal year 1971 R.D.T. & E. funds under a rapid development concept. The development testing of these models at Naval Weapons Center, China Lake, which included several launches, has been successfully completed. The fiscal year 1973 procurement funding is requested for the evaluation quantity and is in conformance with Department of Defense policy stated in DOD Instruction 7220.5 of January 24, 1968.

Senator YOUNG. How much of this total request is for the procurement of conventional iron bombs and associated fuzes?

Admiral CLANCY. $69.3 million in the fiscal year 1973 budget is for conventional bombs and includes $60.8 million for the 500-pound MK–82, $6.1 million for the 1,000-pound MK–83, and $2.4 million for the 2,000-pound MK–84.

Chairman ELLENDER. I note that $20.4 million is requested for the procurement of the 2.75-inch rocket. No funds were provided for the procurement of this weapon in fiscal year 1972, and only an insignificant amount for fiscal year 1971. What accounts for this?

Admiral CLANCY. A noticeable drop in Southeast Asia requirements for this weapon is the reason the fiscal year 1971 and fiscal year 1972 procurement of this weapon was so insignificant. Expenditures of the 2.75-inch rocket by carrier based aircraft, both fighter and attack, dropped markedly after more lethal weapons, the 5-inch Zuni rocket, Rockeye and FAE, became available in quantity. Today only the helicopter gun ships and forward air controller (FAC) aircraft continue to use the 2.75 inch in Southeast Asia, and the large inventory previously required to support usage from fighter and attack aircraft was made available for (1) usage by the remaining shore based aircraft, and (2) continued training requirements.

The 2.75-inch rocket continues to be the Navy's primary training rocket instead of the more expensive Zuni. Future training and the balance of SEA requirements cannot be met by inventory carryover which was possible in fiscal year 1971 and fiscal year 1972. Therefore, resumption in procurement is necessary in fiscal year 1973 to meet consumption as well as maintain an acceptable level of readiness.

Chairman ELLENDER. I wish you would comment on the request of $35 million for the procurement of the Zuni rocket.

Admiral CLANCY. Zuni, a 5-inch rocket, has been designed to be the Navy's lowest cost forward firing, flak suppression weapon. A series of design modifications to upgrade the Zuni rocket system have resulted in improvements which provide greater range and better accuracy. The greater range allows for firing of the rocket at a safer distance from the target and should reduce aircraft and pilot attrition. Accu-

racy has not been sacrificed for this range improvement, and in fact ballistic dispersion has been reduced 50 percent with the design changes. Improved accuracy also contributes to a reduction in aircraft and pilot attrition since fewer sorties are required to destroy the targets.

The fiscal year 1973 program reflects a $11.7 million increase over fiscal year 1972 which is due to an increase in the quantity to be procured. The increased number of weapons is needed to meet planned SEA consumption and maintain an acceptable level of readiness. In addition to the range and accuracy improvements incorporated in prior year procurements, the fiscal year 1973 Zuni request is introducing the application of thermal protection material to the launcher in order to make it capable of withstanding aircraft fuel fires for up to 10 minutes without violent reactions.

Chairman ELLENDER. Please comment on the request of $1.3 million for the procurement of airborne expendable countermeasure items.

Admiral MINTER. Airborne expendable countermeasures items are self-protection devices carried by all Navy tactical aircraft such as the A–4, A–7, F–4. In addition, in certain cases these devices are used to protect ships [deleted].

SHIP GUN AMMUNITION

The fiscal year 1973 ship gun ammunition program of $49.5 million together with prior year assets will provide for planned Southeast Asia consumption, worldwide training consumption and achieve approximately [deleted] percent of the war reserve requirements. We are: (1) improving and buying [deleted] fuzes because of their capability against antiship missiles; (2) procuring state-of-the-art VT fuzes with significantly improved characteristics; (3) procuring more 5″/38 and 5″/54 AAC assets because of their versatility against air, surface and shore targets; and, (4) programing for improved longer range 5″/54 projectives with increased lethality which can be produced with greater safety and can be more easily demilitarized. The PUFF, nonexplosive training round has been introduced in the Atlantic Fleet, to overcome environmental problems related to the use of explosive training rounds.

Chairman ELLENDER. Is the $49.5 million requested for ship gun ammunition the items set out as lines Nos. 1, 2, and 3 under budget activity 4 for the P–1 exhibit?

Admiral MINTER. Yes, sir.

Chairman ELLENDER. Does this request of $49.5 million include funds for any ammunition item that has not been procured in prior fiscal years, and if so, please comment on these new items.

Admiral WOODS. The request of $49.5 million includes funds which will be used to procure a quantity of 5″/54 improved projectiles during fiscal year 1973. It is estimated that approximately 25 percent of the total 5″/54 projectile requirement in fiscal year 1973 will be procured as the new improved projectile. This projectile will provide improvements over and above the capability of the present design of 5″/54 projectiles including:

(*a*) Greater lethality [deleted].

(*b*) Decrease [deleted] in flight time to target.

(*c*) Increased range to [deleted] yards.

(*d*) A cast PBXW–106 explosive load to provide increased safety, improved preformance and a producible design capable of optimum quality control.

(*e*) Easier demilitarization.

GROUND MUNITIONS

In the ground munitions area we are requesting $5.2 million for small arms ammunition, and pyrotechnic/demolition material.

The fiscal year 1973 expendable ammunition reduction, $12.8 million below 1972 is primarily related to the Southeast Asia winddown [deleted] and the reduced call for ship gun fire and ground support.

Chairman ELLENDER. I assume that the $5.2 million requested for ground munitions are the items set out in line Nos. 7 and 8 of budget activity 4 in the P–1 exhibit.

Admiral WOODS. The assumption is correct.

ANTISHIP MISSILE DEFENSE PROGRAM (ASMD)

The fiscal year 1973 OPN request includes $181.4 million identifiable directly or indirectly with the Navy's antiship missile defense program. It is one of our higher priority programs and is critical to the survival of the fleet in a missile environment. This is a long range program to provide approximately [deleted] fleet units over the next 5 years with an integrated combat weapons system to obtain an increased effectiveness against the antiship missiles. All modes of naval warfare are required to combat these missiles and their launching platforms with the goal of defense-in-depth being paramount. [Deleted.] In addition, the capability of launching missiles from [deleted] within the area defense perimeter has resulted in orienting the fiscal year 1973 ASMD plan to a point defense concept, doubling the $90.3 million requested in fiscal year 1972 and reflects the urgency the Navy attaches to this program.

Efforts to enlarge the scope of the ASMD plan to keep abreast of this serious missile threat by expediting developments and procurements have been tempered by our need to retain an overall balance of Navy programs. Our ASMD requirements cover all facets of the ASMD problem, active and passive detection, deception and hard kill. In balancing the fiscal year 1973 ASMD segment within the total Navy program [deleted]. Accordingly, each ship called out in the yearly plan is being equipped with an ASMD suit tailored to best provide a reasonable point defense capability. The major categories to be funded in fiscal year 1973 are:

	Millions
Weapons systems	$129.9
Radar systems	29.1
Electronic warfare systems	10.6

COMMAND AND CONTROL SYSTEMS—$11.8 MILLION

Weapon systems provide the [deleted] capability and include the improved point defense system (NATO Sea Sparrow), close-in-weapons system (CIWS), surface missile systems and the 5″/54 MK 42 gun mount conversions. A brief description of each follows:

NATO SEA SPARROW

Our request of $36.4 million funds this second generation point defense missile system. By international agreement, we are committed to procuring [deleted] systems during a 2-year period with additional NATO participation. Fiscal year 1973 request for [deleted] systems of NATO Sea Sparrow will complement more sophisticated area-defense AAW missile systems.

Chairman ELLENDER. To what does your reference to international agreements refer?

Admiral MINTER. This NATO Sea Sparrow is a weapon that we are developing in conjunction with some of our NATO allies. Admiral Wods here has complete information on this, sir, if you would be interested in hearing more about it.

Chairman ELLENDER. Is it a joint effort?

Admiral WOODS. Yes, sir; it is a joint effort.

Chairman ELLENDER. On what basis financially?

Admiral WOODS. Each country initially decided how many systems they would like to buy. Based upon this, we have started a joint development program of which the United States is the major partner. The other partners are the Dutch, Norwegians, Danes, Italians and the Belgians. We are all sharing the cost.

Chairman ELLENDER. In what proportion?

Admiral WOODS. The United States has about 80 percent of the total.

Chairman ELLENDER. The United States will furnish 80 percent of the cost and five other countries 20 percent. We are practically carrying the entire load.

Admiral MINTER. I think, Mr. Chairman—I am not disputing you on that—I think, to be sure you understand how the cost sharing goes, we are buying more of the weapons and therefore our cost will be greater than theirs are. They are paying the same basic cost for the weapon.

Chairman ELLENDER. Who is making it?

Admiral WOODS. We are again making them jointly but with essentially 80 percent of the work being done by the United States.

Chairman ELLENDER. There you are. Eighty percent.

Admiral WOODS. On the other hand, we are going to have about 80 percent of the systems.

Chairman ELLENDER. I understand that. But for their protection and ours, too.

Admiral MINTER. The ones we are procuring are for our ships.

Chairman ELLENDER. I could understand, 20 years ago, when our allies were not as prosperous as they are today, why we might assume most of the financial burden. Today this is no longer an excuse. Our Government is entirely too generous.

Admiral WOODS. May I add something, Mr. Chairman? We had intended to develop this system by ourselves. Had we been doing it by ourselves, we would be bearing the total cost of development.

Chairman ELLENDER. I know how big Uncle Sam's heart is. As long as we let those people lean on our shoulders, they will take advantage of us.

Admiral WOODS. This is the first time they have put up any money.

Chairman ELLENDER. Off the record.
(Discussion off the record.)
Chairman ELLENDER. Back on the record.)
Is the $36.4 million requested for the NATO Sea Sparrow the item set out as line 32 of budget activity 4 of the P–1 exhibit entitled "Improved Point Defense"?

Admiral WOODS. Yes. The NATO Sea Sparrow missile system is a major portion of the U.S. Navy's improved point defense surface missile system.

Senator YOUNG. It is my understanding that this $36.4 million will provide for the procurement of 14 of these systems. Exactly what is the nature of the equipment you are procuring, and does it include any funds for the procurement of the modified Sparrow missile?

Admiral WOODS. Taking the last question first, the $36.4 million does not procure the modified Sparrow missiles; these missiles are procured under the PAMN appropriation. These OPN funds are for procurement of the NATO Sea Sparrow surface missile system. Each system consists of two target tracking and illuminating radar directors and an eight cell missile launching system with their associated equipments. This includes radar transmitters, power supplies control cabinets, a target data processor, a digital computer, radar set consoles, and a firing officer's console.

Chairman ELLENDER. Earlier, we discussed the international aspects of this program. On page 3 of the justifications, I note the following statement. "The United States Navy is committed by international agreement to procure a total of [deleted] NATO Seasparrow systems, [deleted] of which will be trainers, during fiscal years 1973 and 1974. What is the basis for this commitment?

Admiral WOODS. The basis for this commitment is a letter from the Chief of Naval Operations to me dated May 22, 1970, which established the requirement for U.S. Navy procurement of a total of [deleted] NATO Sea Sparrow systems during fiscal years 1973 and 1974. In accordance with an International Memorandum of Understanding dating back to June 1968, for cooperative development and production, each participating government is represented by a member on the NATO Sea Sparrow Project Steering Committee. I am the U.S. member. The May 22, 1970, letter established the U.S. Navy's fiscal years 1973 and 1974 production requirements. On June 29, 1971, the Chief of Naval Operations sent another letter to me, again, as the U.S. Member of the Steering Committee, reaffirming the U.S. Navy procurement requirement in fiscal years 1973 and 1974 in order to make the requirement known to the other participating governments at the 11th NATO Sea Sparrow Project Steering Committee meeting. I then made our requirement known to the other participating governments at the Steering Committee meeting, in August 1971, acting in my designated capacity in accordance with the provisions of the International Memorandum of Understanding (MOU). We plan to formalize this commitment by an amendment to the MOU following the appropriation of fiscal year 1973 funds.

Senator YOUNG. I note that you will procure 14 systems during fiscal 1973. How many of these will be installed on U.S. Naval ships and what types are the ships?

Admiral Woods. Under line 32, all 14 systems will be installed on U.S. Naval ships. These ships are primarily our higher valued aircraft carrier, auxiliary and amphibious types such as the CVA, AS, AFS, AOE, AOR, LKA, LPD, and LPH classes.

Chairman Ellender. It is my understanding that this system is a follow on to the original basic point defense surface missile system. Is this correct?

Admiral Woods. Yes, that is correct. The basic point defense surface missile system was developed primarily by the integration of existing equipments. It is a manual system with certain operational limitations in adverse environments. The improved point defense surface missile system is being developed with the latest technology to provide an automatic, all-weather, rapid reaction defense system to counter the projected air and missile threat to naval ships in the mid to late 1970's.

CLOSE-IN-WEAPON SYSTEM (CIWS)

Chairman Ellender. Admiral, before you begin with your discussion of the $23.2 million requested for the close-in-weapon system, I would like to have the weapon data sheet included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE DATA SHEET

Service: Navy.
Nomenclature: CIWS (Phalanx) MK 15 MOD 0.
P-1 Line Item No.' 41.
Popular Name: Phalanx.

Description/Mission: The mission of the Close-In Weapon System (CIWS) is to provide a rapid reaction all-weather, lightweight defense against the anti-ship missile threat and low-flying aircraft. The CIWS is a unitized gun weapon system incorporating a search and track radar at K band, a fire control system, 20mm gatling gun and special 20mm ammunition. The system searches, detects and acquires low flying targets, evaluates these targets and opens fire.

COST DATA

[Dollars in millions]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate total program
CIWS procurement:										
Quantity				9	100	140	190	210		650
Cost				$23.2	$65.7	$78.8	$98.9	$108.5	$19.0	$394.1
Processing unit cost				2.577	.650	.563	.521	.517		.606
Weapon system cost				23.2	65.7	78.8	98.9	108.5	19.0	394.1
Initial spares				3.0	11.0	8.0	3.0	2.0	2.0	29.0
R.D.T. & E	$3.5	$8.2	$14.6	8.9	2.0	.8	.5	.4		39.0
Milcon										
Program acquisition cost	3.5	8.2	14.6	35.1	78.8	87.6	102.4	110.9	21.0	462.1
Program unit cost										.711
Total additional cost					4.0	58.0	84.8	112.1	127.0	385.9

Basis for FY 1973 Budget Request: The Navy has established a requirement to equip fleet ships with a "last ditch" defense against the anti-ship missile threat in the shortest time frame possible. The PHALANX Close-In Weapon System has been accelerated to meet this objective. This accelerated program calls for a 140 unit directed buy in FY 1973, FY 1974 and FY 1975 with first delivery in June 1973 followed by a competitive buy for the remainder of the program.

Test Data

(*a*) Preliminary design review, July 1971.
(*b*) Tracking tests, August 1971.
(*c*) Round demonstration, October 1971.
(*d*) Stabilization tests, December 1971.
(*e*) Environmental tests, April 1972.
(*f*) Systems tests, August 1972.
(*g*) TECH/OPEVAL complete, May 1973.
(*h*) Service approval, May 1973.

Contract Data

Major Subsystem.—Prime Contractor, Entire System.
Contractor.—Generaly Dynamic Division.
Type of Last Contract.—Cost Plus Incentive Fee.

	Class	Operational requirement	Demonstrated
Performance:			
Detection range—Minimum	C	5,600 yds	(1).
Reaction time	C	3 secs	(1).
Probability of kill	C	0.75	(1).
Rate of fire	U	3,000 r.p.m	3,000 r.p.m.
Characteristics:			
Weight	U	10,000 lbs	
Base size	U	6 feet 6 inches by 9 feet 0 inches	
Height to top of radome	U	15 feet 1 inch	
Angle of elevation	U	—30 degrees to 85 degrees	
Train (azimuth) coverage	U	330 degrees	

[1] Performance will be demonstrated during TECH/OPEVAL, scheduled for completion in May 1973.

COST HISTORY COMPARISON

[Dollar amounts in millions]

	Quantity	Amount
Initial planning estimate:		
Procurement	1,000	600.0
R.D.T. & E	1	28.5
Milcon		
Total program costs		628.5
Current estimate total program (fiscal year 1972 budget submission): [1]		
Procurement	(2)	(2)
R.D.T. & E		
Milcon		
Total program costs		(2)
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	650	423.1
R.D.T. & E	2	39.0
Milcon		
Total program costs		462.1

[1] A procurement program budget submission was not made for fiscal year 1972, because the program was still in the early stages of engineering development.
[2] Not available.

Note: The increase in per unit cost is a result of smaller quantity planning base, increased scope of program and cost growth.

CLOSE-IN WEAPON SYSTEM (CIWS)

Admiral MINTER. The $23.2 million funding requested in fiscal year 1973 is for the initial procurement of a close-in weapon system (CIWS) concept. This is the VULCAN PHALANX weapon system, the best alternative in providing individual ships a defense against the antiship missile threat. CIWS is a unitized gun weapon system, incorporating a search and track radar, a fire control system, 20MM gatling gun and special 20MM ammunition. These funds will cover pilot line startup production costs and manufacture of nine systems in fiscal year 1973. Installation of these systems will commence early in fiscal year [deleted].

Chairman ELLENDER. Now, I note on the weapon data sheet that this effort involves a rather substantial R. & D. effort, with [deleted] program for fiscal year 1972 and [deleted] requested for fiscal year 1973. I note on page 2 of the data sheet that three of the four performance requirements have not yet been demonstrated for this weapon system and they will not be demonstrated until the completion of the technical operational evaluation which is scheduled for completion in [deleted]. I assume these nine systems you are requesting for fiscal year 1973 are for the operational evaluation. Am I correct?

Admiral WOODS. That is correct. These nine units will have been preceded by two prototype systems and if they meet our expectations, they will be suitable for installation and evaluation aboard a variety of ships. Successful demonstrations with these initial units will be the basis of planned large quantity procurement in the following years. These units will also provide us some production experience as well as procurement and installation data.

Chairman ELLENDER. This is an expensive program. Based on the production of [deleted] number of these systems, the total estimated cost is $462.1 million, including $39 million for R. & D. Do you feel that your planned procurement program is reasonable in view of the current R. & D. status of this system?

Admiral WOODS. We are now about halfway through the engineering development phase of this program. Tests to date show the system to be very promising and because of the urgency in the fleet for a hard kill defense against antiship missiles, we are pursuing the program on an accelerated basis. For fiscal year 1973 we are requesting funds to procure a small quantity of units. These units will be installed aboard ship and used to determine their operational suitability prior to committing for follow-on, large quantity procurement. Thinking optimistically, the Phalanx system may be installed aboard as many as 300 ships and our current long-range planning supports this view. At the same time we must be mindful that the system has yet to prove its value to the fleet and be prepared to revise our planning accordingly.

Senator YOUNG. What types of ships will this system be deployed on?

Admiral WOODS. Because of its small size and low weight, PHALANX CIWS is suitable for installation aboard virtually all types of

ships. First priority would go to the high-value combatants, then to the auxiliaries and service ships. It also appears practical to provide temporary installations aboard convoy or merchantmen for the duration of a particular mission.

Senator YOUNG. When do you expect this system to become operational in the fleet?

Admiral WOODS. Our target for an initial operational capability in the fleet is July 1973. This would be with the nine units for which we are requesting fiscal year 1973 funding. This is an accelerated, optimistic schedule which would be dependent upon contained success with our development tests.

SURFACE MISSILE SYSTEMS (SMS) MATERIAL AND MAINTENANCE EQUIPMENT

The request for $53.5 million in fiscal year 1973 includes $34.7 million for vital ordnance alterations needed to improve the operational effectiveness of our 76 Terrier, Tartar and Talos ships for area defense and offensive missions until well into the 1980's. The major portion of the program is devoted to better computer and radar equipment to provide improved defensive capability and rapid reaction [deleted]. Also included in Interim Surface-to-Surface Missile System (ISSM) where funding of $7.4 million modifies shipboard weapon systems to use the standard missile. This is an expansion of the ISSM program started in fiscal year 1971. An additional $3 million provides for UHF telemetry equipment. Finally, within the SMS category, $8.4 million is requested for SMS training support including SMS simulators and training equipment modification.

Chairman ELLENDER. You indicated that the request includes $53.5 million for surface missile systems material and maintenance equipment. In looking over the P–1 exhibit I can identify $52.6 million of this total as follows: Line 25, $3 million; line 26, $4.5 million; Line 27, $34.7 million; line 28, $7.4 million; and line 58, $3 million. Are all of these items associated with this request?

Admiral MINTER. Yes, sir.

Chairman ELLENDER. This leaves a balance of $900,000. Can that be identified in the P–1 exhibit?

Admiral MINTER. Yes, Mr. Chairman. This $900,000 is for budget activity 4, line item 59, SMS training equipment ordnance, alteration installations.

Senator YOUNG. How does the $34.7 million requested for improvements to the Tartar, Terrier, and Talos systems differ from the funds requested for the support of these systems in the procurement appropriation?

Admiral WOODS. The $34.7 million requested here procures improvements to shipboard weapons systems, excluding the missile, while funds requested in the procurement PAMN appropriation provide for missile procurement, modifications, and support. The funds, $34.7 million, requested here provide the [deleted] Terrier, Tartar, and Talos operating ships with the latest known and proven shipboard weapon system improvements to defense against the increasing enemy air threat, aircraft and missile, to the operating fleet. The procure-

ments made each year are limited to the ORDALTS that will actually be needed to meet forthcoming ship overhauls. In addition, the funds also provide for minor ORDALTS to the Talos Weapon System on board [deleted] cruisers and basic point defense systems being installed on [deleted] ships of various classes.

Senator YOUNG. I note that you say we have [deleted] Terrier, Tartar and Talos ships now in the fleet. How many ships will be improved with this $36.4 million you are requesting?

Admiral WOODS. The $36.4 million requested will provide major improvements to [deleted] DLG's, [deleted] DDG's, [deleted] DEG's and one training school. [Deleted] of the DLG's are "Double-Enders" and therefore require twice the procurements of the other DLG's. As stated earlier, the procurements each year are limited to proven modifications that will actually be needed to meet forthcoming ship overhauls.

Chairman ELLENDER. Are these improvements compatible with the standard surface-to-air missile that is gradually replacing the Terrier and the Tartar?

Admiral WOODS. Yes; all of these improvements are compatible with Standard missile.

Senator YOUNG. With respect to the $7.4 million requested for the interim surface-to-surface missile system, I wish you would be specific with respect to what you plan to do with these funds.

Admiral WOODS. The $7.4 million requested is to procure specific modifications to shipboard weapon systems—excluding the missile—to provide a Standard missile offensive capability against surface targets to counter the existing Soviet surface-to-surface threat. Most of the selected ships—DDG's and DEG's—are currently equipped with an area air defense weapon system that has a limited secondary surface-to-surface capability utilizing a Standard missile with a semiactive homing seeker head. This program will enable these weapon systems to fire a Standard missile with antiradiation mode, or active seeker head in surface-to-surface engagements against enemy ships. The other selected ships—DE's and PG's—have no missile capability. This program will provide those ships with the capability to fire Standard missile with either one of three seeker heads; semiactive, active or antiradiation mode. This is an interim program pending full deployment of Harpoon which is not anticipated until the late 1970's.

Chairman ELLENDER. I note that this is an interim system pending the development and deployment of the Harpoon surface-to-surface missile system. When do you expect the Harpoon to become operational?

Admiral WOODS. The initial operating capability of Harpoon is in [deleted]. Starting in [deleted] Harpoon will first be deployed [deleted]. Even then, the ISSM Standard missile will not be replaced, but will serve to complement the Harpoon mission until inventories are expanded.

Senator YOUNG. How many ships will be modified with the $7.4 million you are requesting for fiscal year 1973 for the interim system?

Admiral WOODS. The $7.4 million requested for fiscal year 1973 will provide modifications for [deleted] DDG's [deleted] DEG and the Navy Guided Missile School at Dam Neck, Va.

Chairman ELLENDER. Could you be a little more specific with respect to the $3 million requested on line 25 for UHF telemetry equipment?

Admiral WOODS. The $3 million requested on line 25 provides for procurement of UHF telemetry equipment to replace VHF equipment for use in measuring and evaluation shipboard and land based missile firings. The conversion from VHF to UHF is required to [deleted] to comply with the Geneva Convention Agreements of 1960. Permanent UHF stations have been procured in prior years and are currently installed on all cruisers and carriers with surface to air missiles. Portable UHF stations are planned for use on DLG's, DDG's, DEG's and ships receiving point defense systems but not on a one for one basis. A total procurement of [deleted] portable UHF stations is planned. [Deleted] of the stations will be for use with Terrier and Tartar systems aboard [deleted] DLG's, [deleted] DDG's, and [deleted] DEG's. The balance of [deleted] systems will apply to the [deleted] basic point defense systems currently being installed in the fleet. These quantities will support the deployed fleet only, since approximately [deleted] of the fleet is normally in ROH/RAV. Prior to fiscal year 1973, 21 portable stations have been procured. The $3 million requested in fiscal year 1973 will procure seven additional portable stations toward the total requirement of [deleted]. These UHF systems provide the only shipboard means for evaluating total weapon system effectiveness. Without these systems, results from missile firing training exercises, development tests, operational evaluation tests and research/development could not be measured and evaluated and correction actions initiated.

Senator YOUNG. $4.5 million is requested on line 26 for the procurement of surface missile system maintenance training equipment. Comment on the nature of this equipment.

Admiral WOODS. $2.9 million of these funds are for the procurement of one complete NATO Sea Sparrow missile system necessary for training both enlisted and officer personnel in maintenance and operation techniques. This system will consist of two target tracking and illuminating radar directors and an eight-cell missile launcher system with their associated support equipments. The remaining $1.6 million is required for curriculum update, instructional equipments other than major combat and updating of test equipment in support of currently installed systems.

5"/54 MK 24 GUN MOUNT CONVERSION

The $16.8 million provides for continued conversion of 5"/54 gun mounts which will result in simpler operations, higher reliability and effectively engage ships, aircraft and antiship missiles.

Chairman ELLENDER. Is that conversion to modernize the gun?

Admiral MINTER. Yes, sir; these guns have had a history of unreliability for one thing and actually this does provide us with much greater reliability.

Admiral WOODS. [Deleted] guns.

Chairman ELLENDER. To modernize [deleted] will cost $16.8 million.

Admiral WOODS. Yes, sir. It is a very extensive modernization.

Chairman ELLENDER. How many ships will ultimately be involved in this program?

Admiral Woods. There are a total of [deleted] of these mounts in the Navy and we hope to modernize all of them.

Chairman Ellender. This would modernize——

Admiral Woods. This would modernize [deleted] of those [deleted].

Chairman Ellender. So it would be done over a considerable period.

Admiral Woods. Yes, sir. Until [deleted].

Chairman Ellender. Destroyers?

Admiral Woods. Yes, sir.

Chairman Ellender. You say you want to modernize 128. How many of these modernizations have been funded through fiscal year 1972?

Admiral Woods. The plan is to modernize 129 5''/54 Cal. gun mounts Mk 42 Mods 7 and 8 to Mod 10. There were 45 kits and 22 conversions funded through fiscal year 1972.

Chairman Ellender. Continue.

RADAR SYSTEMS

Admiral Minter. Radar systems provide the needed detection and tracking. The $29.1 million requested includes the procurement of the new long range SPS–49 radar and the new shorter range SPS–58. The greater portion of these funds are needed for modifying existing radars, particularly upgrading their reliability, but also including reduction of false targets by the addition of the coherent side lobe canceler. In addition, the procurement of performance monitors will insure maximum detection reliability of our radars.

Chairman Ellender. In looking over the P–1 exhibit; it seems to me that the $29.1 million you have discussed for these radar systems is in the following items in the P–1 exhibit: Line 2, AN/SPS–40 Improvement, $5.1 million; line 5, AN/SPS–48A and AN/SPS–48 Improvements, $11.4 million; line 6, ASMD radar modifications, $2.5 million; line 7, AN/SPS–58 radar, $2 million; line 8, AN/SPS–49 radar, $2.5 million; line 11, performance monitors, $3.1 million; and line 53, REWSON items under $500,000, $2.5 million. Are these the items included in this $29.1 million for radars?

Admiral Minter. With the exception of line 53, REWSON items under $500,000 at $2.5 million you are correct. That $2.5 million is made up of line item 10, CSLC for Search Radars, $1.8 million and line item 12, AAW program support, $0.7 million.

Senator Young. In discussing the need for the modification of these existing radars, you refer to "false targets." What does this term mean?

Admiral Sonenshein. A false target is one introduced into the radar receiver by the environment, by the action of another equipment or party, for example—jamming, or by radio frequency interference which is processed by the radar receiver as a true target. [Deleted.]

Chairman Ellender. Of the total requested, $4.5 million is for the procurement of 10 new radar systems designated the AN/SPS–58 and the AN/SPS–49. What are the capabilities of these new radar systems, and what ships will they be installed on?

Admiral Sonenshein. [Deleted.]

Senator YOUNG. How many of these existing radar systems will you modify with the funds you are requesting?

Admiral SONENSHEIN. The funds requested in fiscal year 1973 will provide for procurement of modifications for the following 11 radar systems: AN/SPS-40, AN/SPS-40A, AN/SPS-40B, AN/SPS-48, AN/SPS-48A, AN/SPS-10, AN/SPS-29, AN/SPS-37A, AN/SPS-43, AN/SPS-39A, and AN/SPS-52.

Chairman ELLENDER. With respect to the $3.1 million requested for performance monitors, this seems to be a new item. Just what is the function of this piece of equipment?

Admiral SONENSHEIN. The performance monitor permits a complete quantitative check of a radar without interfering with the normal operation of the radar. It provides reliable means of adjusting the radar system components to obtain maximum detection sensitivity. Present radars have no way to obtain this information without extensive testing. The performance monitor will be applicable to all major air search radar systems.

ELECTRONIC WARFARE SYSTEMS

The Electronic Warfare Systems portion of our ASMD suit, at $10.6 million, provides for our electronic detection, threat reaction and decoy systems.

Chairman ELLENDER. Please identify the $10.6 million requested for electronic warfare systems by line number in the P-1 exhibit.

(The information follows:)

[Dollars in millions]

	Fiscal year 1973
BA-LI:	
2-48—ASMD Threat Reaction System	1.9
2-53—REWSON items under $500,000	2.5
2-59—WLR 1 improvement	1.9
4-6—Anti-Ship Missile Decoy System	2.4
4-30—Unmanned Seaborne Target	1.9
Total	10.6

COMMAND AND CONTROL SYSTEMS

Admiral MINTER. In fiscal year 1973 the fourth system at $11.8 million, ties the ASMD package together. It is the Command and Control System, which provides for electronic transmission of practical data and quick reaction to counter the missile threat.

Chairman ELLENDER. These control systems are on ships?

Admiral WOODS. These are on ships.

Admiral MINTER. For the protection of ships.

Chairman ELLENDER. Of the $11.8 million requested for command and control systems, I assume that $8.4 million is the item set out on line 2 of the P-1 exhibit for the Navy Tactical Data System. Am I correct?

Admiral MINTER. You are correct, sir. It is for the Navy Tactical Data System, but I believe that is line item 1 instead of line item 2.

Senator YOUNG. Would you identify the balance of this request by line numbers in the P-1 exhibit?

Admiral MINTER. The balance of $3.4 million, making the total of $11.8 million is identified with budget activity 4, line item 29, ship anti-missile integrated defense.

Chairman ELLENDER. You are able to put all of this new equipment on existing ships?

Admiral MINTER. Yes, sir.

The missile threat is a major concern to us, Mr. Chairman, and you have noticed in here in some of these requests we have for new systems. We have a close-in weapon system referred to a few moments ago that we are trying to start production on. This is very sophisticated and advanced, and almost automatic system which provides a very high rate of fire, 20-millimeter gun, automatically controlled at a range of about [deleted]. It fires 3,000 rounds per minute rate of fire at an incoming missile. This will give you an idea of what it looks like (indicating). This is what we are shooting for, accelerating, getting production of this and getting it aboard our carriers and other high value ships initially.

Commander Paulk is the project officer. This is the idea of what the round itself looks like. Three thousand of these per minute coming out of this gatling gun controlled by this fire control system. The acquisition radar is supposed to pick up an incoming missile and have this high envelope of fire to knock it down when it gets close to our ship.

SIZE AND RANGE

Chairman ELLENDER. Is this the size?

Admiral WOODS. Yes, sir.

Admiral MINTER. Excuse me, that is the actual size. That is what actually hits.

Senator YOUNG. What would the range be?

Admiral MINTER. It is programed for [deleted] acquisition range. That is about [deleted] and 3,000 rounds a minute will be fired at an incoming missile. As it comes in closer this high volume of fire is supposed to take care of it. This missile would be one of the primary threat weapons we would be concerned about and would use this system against

Senator YOUNG. This is a much shorter range.

Admiral MINTER. It is only intended to get the missile when it is in closer to the ship. There is [deleted] firing time, but 3,000 rounds per minute gives you a very high rate of fire at the incoming missile. As I say, the system is practically automatic. It does not depend on a gun crew doing what we used to have to do. When this system identifies the incoming target it is ready to go.

TEST FIRING

Senator YOUNG. Have you tested it against incoming missiles?

Commander PAULK. We have tried it against targets successfully. It permits firing automatically. It will hit the target like nothing else ever has before.

Admiral MINTER. This is not in production. We are asking for production funds for the first nine systems which is the total buy we are asking for fiscal year 1973. A particular ship, an aircraft carrier might have four of these units, for example, aboard.

Chairman ELLENDER. Proceed.

Admiral MINTER. In the more complex installations, data transfer systems integrate all functions to insure maximum compatibility, and mutually supportable effectiveness.

In addition to these systems, we are accelerating development of active and passive detection and active deception systems in R. & D. (Shortstop, Automatic Threat Reactor System SLQ–17, and Automatic Warning System (AN/WLR–8)), which together will automatically recognize and react to divert incoming missiles.

The above systems are being procured to be variously applied to upgrade the ASMD capability of [deleted] combatant ships in fiscal year 1973. Approval of this segment will significantly increase our ASMD capability.

SPARES AND REPAIR PARTS

Requested is $162.9 million in fiscal year 1973 for spares and repair parts. Of this, $94 million represents material to be procured as replenishment support of equipments budgeted in prior years, $68.9 million is for initial support of new equipment. Each of these categories can be further subdivided into generic types of equipment to which they apply, such as communications and electronic equipment, ordnance support equipment, and ships support equipment to name a few. Examples of some of the items which comprise the nearly $69 million requested for initial support are:

	Million
MK–48 torpedo	$18.8
NATO Sea Sparrow missile	4.5
Close-in weapon system	3.0
AN/SQQ–14 sonar	1.9
Towed Array Sonar System (TASS)	1.7
LAMPS support equipment	1.4
Polaris/Poseidon	3.7

Chairman ELLENDER. Please provide a tabulation for the record identifying the $162.9 million requested for spares and repair parts by budget activity and line number in the P–1 exhibit.

Admiral MINTER. Yes, sir.

(The information follows:)

Spares and repair parts

BA–LI and Item:	*Fiscal year 1973*
Total initial spares	$68.9
1–6—Initial ships spares	2.3
2–18—Initial electronic spares	21.2
3–64—Initial aviation spares	5.1
4–67—Initial ordnance spares	39.3
5–12—Initial civil engineering repair parts	.9
7–9—Initial command support spares	.1
Total replenishment spares	94.0
1–6—Replenishment ships spares	45.3
2–18—Replenishment electronic spares	21.5
3–64—Replenishment aviation spares	1.4
4–67—Replenishment ordnance spares	25.8
Total spares and repair parts	162.9

REPLACEMENTS AND REPARABLES

Chairman ELLENDER. Have you any spare parts purchased in fiscal years 1971 and 1972 that you can use?

Admiral MINTER. Yes, sir; we do, but there is a continuing need to procure stocks of the new items which we have never used previously, to increase stocks of existing items to cover demand arising from introduction of these new systems, and to replace repairable items turned in for restoration which either are not economically repairable or do not survive the rework process. I should add that virtually all the items procured with these funds are repairables which we recycle and use over and over again.

Chairman ELLENDER. Is this for the entire fleet?

Admiral MINTER. Yes, sir.

Chairman ELLENDER. What amounts did you spend in——

1972 APPROPRIATION AND 1973 BUDGET REQUEST

Admiral MINTER. Last fiscal year 1972 in this total account we had $148.2 million. We are requesting $162.9 million now. I have a breakdown on what each activity accounts for in the way of electronic spares and replenishment support and so on.

Chairman ELLENDER. To what extent has this work been accelerated because of the war in Southeast Asia?

Admiral MINTER. I don't think we could say that this is closely associated with that. The 1973 buy is certainly not associated with the war in Southeast Asia.

Chairman ELLENDER. You mean to say that even when we are not at war, we will continue to spend this huge sum?

Admiral MINTER. Yes, sir, we certainly do. We are operating in ships like our aircraft carriers, our nuclear submarines, and our advance destroyer types. These are very sophisticated weapon systems that have things like radars and high pressure steam plants and electronic equipment of various descriptions and these things are costly to maintain.

Chairman ELLENDER. Admiral Sonenshein.

2–H SPARES

Admiral SONENSHEIN. One portion of this $162.9 million is for what we call 2–H spares. They amount to $47.6 million. Those 2–H spares are for shipboard components such as auxiliary equipment aboard ship. I think the important point is that we have been underfunded in this through the past years so that the level of supply and support has not been adequate. We measure this by the effectiveness by which our supply system can fill requisitions from the fleet. In 1970, for example, Mr. Chairman, the effectiveness in this particular category which comprises about a quarter of the total was 50.3 percent. By improved funding in 1971 and 1972 it rose to 72 percent as of the end of December 1971. That means that, when a ship asks for a part, it has a 72 percent chance of getting that part out of a system without waiting for it to be manufactured somewhere 9 months or a year later.

This level of funding that we are seeking of about $47 million for this particular category will bring this level up to 80 percent. That is

where we think we ought to be. So this is not a one-time affair, it is a continuing improvement that we have been going through for the past 2 years, and which we hope to continue in the future.

Quick Turnover and Insurance Parts

Chairman Ellender. What do you do with those parts not used?

Admiral Sonenshein. There are certain parts not used. What we try to do is separate those that have quick turnover and those that have an insurance nature. The kind you are talking about—for example, we will have a spare propeller shaft. That is not going to be used every year, obviously. It might be used once in 7 years for a particular ship or ship class. So we will buy the number of propeller shafts to meet that kind of forecasted or actual demand. Not that it is related to turnover, but to an insurance nature of having to have it and be able to provide it when you really need it.

The other kind of spares we buy and stock on the basis of their repetitive demand. So we have two broad categories: Those that turn over rapidly and are bought periodically, and those that are of an insurance nature that are bought when the ship is first commissioned or maybe 10 years later.

Obsolescence

Chairman Ellender. To what extent do any of these spares become obsolete so that you can not use them at all, and what do you do with them then?

Admiral Sonenshein. Spares do become obsolete, and in some cases where we replace whole units they could change the radar module or they could change the pump. In those cases we try to return the spares to the supply system for other uses. There may be a ship in the reserve fleet that could use them. If it does not find a home there, it is disposed of.

Admiral Minter. About the center of that page I am reading from, identifies new systems, for example, for which $69 million is being requested for initial support of these items. That is part of this total we are talking about, sir. If I could just speak one bit further about this. This spares problem, as Admiral Sonenshein says, is an extremely important one. I must say I don't think we have done justice to ourselves in the Navy in the past in funding this. It ties in also with such things as overhaul of our ships and aircraft. These are support measures that we must take, and if we don't we pay a tremendously high penalty in the lack of readiness in the fleet. If we have a radar in Southeast Asia that goes down on one of our capital ships and we cannot repair it because we do not have the spare part in the system, we are running a terrible risk.

I feel this is an area that needs a lot of attention from us in the Navy. We have been trying to upgrade our readiness by paying more attention to it in our fiscal 1972 and 1973 request, sir.

Availability of Parts

Chairman Ellender. Proceed.

Admiral Minter. The availability of spares and repair parts spells the difference between success and failure in equipment readiness, for

despite progress made in making equipment more reliable and in training our people to maintain it better, the court of last resort when the equipment does go "down" is whether or not the needed part is available. The Navy has been attacking this problem on a number of fronts in recent years. First, we have stressed adequate funding for the parts themselves, as reflected by increases in the dollars devoted to buying this material. Second, we have increased the funding of repair efforts, for we gain roughly three times as much ready-for-issue material for a dollar spent in repair as we do for a dollar invested in new procurement. Third, we have continued to strengthen our management of this material. An example of this is the assignment of responsibility for monitoring and balancing the full spectrum of spares and repair parts support to a flag officer who reports directly to me. This allows us to bring better balance to trade-off decisions within the spart parts realm, and between spares and principal items of equipment.

The results of these efforts, while not precisely measurable, is reflected in such favorable indicators as:

A decrease in the average time required to supply material needed to repair shipboard equipment casualties when the parts are not immediately available aboard the ship; a slight decrease in the percentage of active aircraft in the Navy which are not operationally ready, due to lack of parts.

An increase in the proportion of requisitions for parts which are able to fill from stock on hand for that purpose in the supply system.

With respect to this last point just mentioned, our objective is to attain consistent supply availability of 85 percent within all categories of material. The spares and repair parts financed by this appropriation are among the most difficult categories to improve in this regard, but we're making progress as shown by the gently rising trend in recent years, from 77 percent in fiscal 1970 to approximately 81 percent as of the end of the first quarter of fiscal 1972.

NUCLEAR SUPPORT

The $127.9 million requested in fiscal year 1973 for nuclear support will provide for the procurement of replacement longer life power units and related instrumentation and control equipment for both submarine and surface ships scheduled for refueling in 1976 and later.

Chairman ELLENDER. Please provide a tabulation for the record identifying the items included in the $127.9 million for nuclear support by line numbers in the P–1 exhibit.

Admiral SONENSHEIN. I will be happy to.

(The information follows:)

[In millions]

P–1 line number and item:	
55—Reactor I. & C. equipment	7.3
57—Reactor servicing and fuel handling	2.0
58—Reactor pumps and heat exchangers	18.1
59—Reactor valves and pipe components	5.0
60—Reactor auxiliary equipment	.6
61—Reactor power units	90.8
62—Reactor items under $500,000	4.1
Total	127.9

Chairman ELLENDER. Is any of this for nuclear cores?

Admiral MINTER. Yes, sir. We have a breakdown here. Power units. I have a total number here if you would be interested.

Chairman ELLENDER. What do you mean by component "procurement"?

Admiral MINTER. There are a number of items included in that: Reactor pumps and instrumentation control equipment and a variety of items that make up that $37.1 million. We could provide that for you, sir.

(The information follows:)

The $37.1 million requested will provide for the procurement of the following components associated with the reactor plant.

[Dollars in millions]

Item:	
Instrumentation and control equipment	7.3
Reactor servicing and fuel handling equipment	2.0
Reactor pumps and heat exchangers	18.1
Reactor valves and pipe components	5.0
Reactor auxiliary equipment	.6
Reactor items under $500,000	4.1
Total	37.1

These components are required for the operation of nuclear-powered surface ships and submarines.

Admiral MINTER. The major procurement items are: Reactor power units, $90.8 million; Component procurement, $37.1 million.

The fiscal year 1973 request includes $90.8 million to provide for the procurement of [deleted] submarine and [deleted] surface ship power units. The surface ship units are part of a multi-year procurement initiated in fiscal year 1971 and continuing through fiscal year 1975.

The remaining $37.1 million requested is for component procurement and includes modified instrumentation and control equipment required for operating longer life cores, spare steam generators and other components required to support the (110) reactor plants in operating nuclear-powered submarines and surface ships.

The number of nuclear-powered ships is increasing each year. Presently, there are 97 operating nuclear-powered submarines and four nuclear-powered surface ships. These ships represent a wide variety of different ship classes and nuclear-propulsion plant configurations, from the very small nuclear propulsion plant in NR–1 to the large nuclear propulsion plants for *Enterprise*. In addition, many of these ships are at an early stage of life where only limited usage of spare and replacement components has been experienced. As the number of ships increases and as all ships get older, usage of spare and replacement components can be expected to increase. Because of the long lead-times involved, it is essential that the Navy have adequate spare and replacement components available as insurance spares. The requirements reflected in the Navy request have been calculated to provide replacement components where these may be needed for maintenance of the growing fleet of nuclear-powered ships.

Chairman ELLENDER. On line 55 of the P–1 exhibit, I note a request of $7.3 million for reactor I. & C. equipment. What is the nature of this equipment?

Admiral SONENSHEIN. Reactor plant instrumentation and control equipment are electronic, electrical and mechanical items used in monitoring and operating Naval nuclear reactor plants.

Chairman ELLENDER. On line 58 of the P–1 exhibit, there is a request of $18.1 million for reactor pumps and heat exchangers. I note that $40.9 million was required for this purpose in fiscal year 1971 and only $5.3 million in fiscal year 1972, but you are requesting $18.1 million for 1973. Just how is the requirement for these items determined?

Admiral SONENSHEIN. The requirements for these items are determined by technical judgments of fleet material needs. The large funding requirement in fiscal year 1971 was for the procurement of replacement steam generators and was the subject of a reprograming approval by congressional committees. The lower funding level in fiscal year 1972 was due to funding constraints. The fiscal year 1973 request reflects the resumption of planned procurement for replacement steam generators on nuclear-powered ships.

FBM/ULMS SUPPORT PROGRAMS

FLEET BALLISTIC MISSILE PROGRAM

OPN funding of $89.6 million in fiscal year 1973 makes an essential contribution to maintaining the high degree of reliability essential to support the FBM fleet as a deterrent force and initiating OLMS component procurement. By providing for procurement of improved sensors, initial and refresher training capability, hydrographic survey support, weapon system equipment for installation during overhauls, alteration kits and shorebased support equipment, the effectiveness and reliability of the FBM system is preserved and enhanced and the ULMS trainer is supported.

Chairman ELLENDER. Please provide a tabulation for the record identifying the line numbers in the P–1 exhibit of the items included in the $89.6 million for the fleet ballistic missile support program.

Admiral MINTER. Yes, sir.

(The information follows:)

FBM/ULMS support

[Dollars in millions]

BA–LI:	*Fiscal year 1973*
1–1—Submarine batteries	*.4
1–16—Sub-silencing equipment	*1.5
2–15—Integrated comm. antenna sub system	*.3
2–63—BQR 19 [deleted]	2.4
2–64—BQR–15 [deleted]	8.6
2–127—Verdin	8.3
2–128—Sect	*1.5
4–68—Initial training	1.0
4–69—Refresher training	19.6
4–70—Training hardware	1.2
4–71—598 Class Ovhl	.1
4–72—608 Class Ovhl	1.4
4–73—Test instrumentation	.8
4–74—Alteration equipment	11.4
4–75—Maintenance and support	3.6
4–76—Test and training expend	3.0
4–77—Naval satellite support	1.0
4–78—ULMS support	23.5
Total	89.6

*Portion of line item related to FBM support program.

Chairman ELLENDER. You do not have the ULM's missile system as yet?

Admiral MINTER. We don't have it yet. This is the year funding is being requested, but I think the Secretary of Defense referred to this, and the Secretary of the Navy also.

Chairman ELLENDER. All of this effort is prior to ULM's production.

Admiral MINTER. We are talking about long lead time items for this. There is a major R. & D. effort going into this area. I am not sure whether Dr. Foster spoke to you about this particular thing.

Chairman ELLENDER. To what does this relate?

Admiral MINTER. This is an excellent program, sir; and this part we are talking about relates to long lead time items. You will have to have them if you go for this system long before the system itself is available for you to test.

Admiral SONENSHEIN. This particular item, Mr. Chairman, is for training equipment to go into the prototype powerplant. AEC is developing a power plant.

Chairman ELLENDER. How much have you in your budget for ULM's?

ULMS

Admiral MINTER. ULMS appears in several of the different appropriations.

Chairman ELLENDER. I wonder if you could summarize the total appropriation request for the ULMS.

Admiral MOORE. It is about $940 million.

Admiral MINTER. We can provide it exactly. It is in the shipbuilding area. It is R.D.T. & E. There is some portion of it here in OPN. We have a breakdown here showing $945.2 million.

Chairman ELLENDER. Suppose you put that in the record.

(The data follow:)

Total ULMS fiscal year 1973 budget request

[Dollars in millions]

Appropriation:	
R.D.T. & E. N	520.4
SCN	361.0
OPN	23.5
PAMN	10.0
MILCON	27.3
O. & M., N	3.0
Total	945.2

Admiral MINTER. The major items in this request are:

	Million
ULMS	$23.5
FBM training	24.8
FBM alteration equipment	11.4
FBM sonars	11.0
FBM communications	10.1

A brief description of each follows:

ULMS

The $23.5 million OPN funding requested in fiscal year 1973, initiates long lead procurement of shipboard-type training items. These train-

ing items will be incorporated in the AEC/ULMS prototype nuclear propulsion plant.

The introduction of the underseas long-range missile system (ULMS) submarine will substantially impact on the requirements to train crews to operate its nuclear propulsion plant. The land-based naval reactor prototype plants, used for operational training, are owned and operated by the AEC primarily for its own use. These plants, however, are used for Navy training purposes based on compatibility with AEC's programs. [Deleted.]

The AEC has approval and is proceeding with the development of the propulsion plant for ULMS. The AEC has indicated its intention to build an ULMS prototype plant without shipboard training equipment as part of the prototype: In order to utilize the AEC prototype as a training facility for Navy operating crews the Navy must provide and install the shipboard equipment to provide this needed training capability.

Chairman ELLENDER. Please provide a tabulation for the record specifically identifying each of the items in the $23.5 million requested for equipment for the ULMS program.

Admiral MINTER. The $23.5 million initiates the long leadtime procurement of the necessary equipment to permit the Atomic Energy Commission (AEC) ULMS prototype reactor plant to be used as a training facility for Navy operating crews. The systems for which components are planned to be ordered with the $23.5 million are: [deleted].

Specific major components include the following: [deleted].

Chairman ELLENDER. Now, I also want you to identify each of the items required for the following schedules for the ULMS program: (1) the initial operational capability date on which the budget for fiscal year 1972 was based; (2) the initial operational capability date for ULMS as set out in Secretary Packard's decision of September 1971; and, (3) the initial operational capability date established in the December 1971 acceleration decision.

Admiral MINTER. At the time of the fiscal year 1972 budget submission, the program was based on system development, that is, a submarine and missile, without the requirement for a missile backfit capability into existing Poseidon submarines. The initial operational capability date was established as the earliest date the system could be deployed within the funding available during the program period. With this constraint the initial operational capability date for both the ULMS submarine and the ULMS missile became [deleted].

The "Packard, September 1971" decision stated that "missile development should be directed to provide for a replacement of the Poseidon in [deleted] should that be necessary, and an optimized design for a new submarine to replace present boats." His decision also stated, "The objective of the ULMS program should be to bring in a new force of reasonable cost [deleted]." The following initial operational capability dates derive from Secretary Packard's decision in September 1971: ULMS I missile, [deleted]; ULMS submarine, [deleted]; and ULMS II missile, [deleted].

As a result of the "December 1971 acceleration" decision, an initial operational capability date of 1978 for the ULMS submarine, that is total system, was established. Subsequent to the September 1971 deci-

sion, and prior to the "December 1971 acceleration" decision, the initial operational capability date of the ULMS I missile was modified to protect a date in CY 1977. In the "December 1971 acceleration" decision the ULMS I missile initial operational capability date remained 1977; no date for the ULMS II missile was established.

FBM TRAINING

The fiscal year 1973 FBM support program provides $24.8 million as follows:

(1) $19.6 million for the expansion of the Poseidon refresher training capability at Charleston. Nonrecurring equipment procurements of the navigational operational trainer maintenance laboratories, as weapons control subsystem trainer, and a Loran phase shift system, this latter for installation at both Charleston and New London. These training equipments are required to support the increasing numbers of deployed Poseidon-configured FBM submarines.

(2) $1.0 million for tactical equipment used in the Poseidon-FBM navigation center to be installed at Dam Neck.

(3) $1.2 million for recurring training hardware costs at the four FBM facilities.

Chairman ELLENDER. Can these facilities be used to support the ULMS system?

Admiral MINTER. Yes, sir. They are currently identified just for the Poseidon but there may be some trade off there and some utilization of these if they can be modified for the ULMS program.

(4) $3.0 million for recurring FBM support requirements for items expended during test or training operations.

FBM ALTERATION EQUIPMENT

The $11.4 million provides out of stock parts for the Polaris equipments and alterations to Poseidon equipments taking advantages of technological progress. These equipments are used to eliminate personnel safety hazards, correct design deficiencies, improve operability, and achieve logistic economics.

FBM SONARS

The $11.0 million requested will continue acquisition of [deleted]. These sonars enhance SSBN survivability by providing increased passive detection and tracking capability for each FBM submarine.

FBM COMMUNICATIONS

The $10.1 million request in this program supports the procurement of essential command and control communication for the FBM submarine forces.

Chairman ELLENDER. All of these will be utilized by the submarines?

Admiral MINTER. Yes, sir.

Captain KENNEDY. There are some shore communication equipments in the fiscal year 1973 program. Included are shore transmit terminals for the VERDIN communication system and automatic guard receiver

terminals which will pick up signals from the submarine emergency communication transmitters in the event of loss of a submarine due to enemy attack or casualty. This equipment will be installed at selected shore sites.

Admiral MINTER. The fiscal year 1973 program continues VERDIN equipment procurement [deleted].

In addition, this year's budget request includes funds to procure shore terminals for automatic reception of HF signals transmitted by the submarine emergency communication transmitter (SECT) to strategic commanders in the event of casualty.

Senator YOUNG. I note on a tabulation I have here that for fleet ballistic missile support equipment you are requesting $66.6 million, compared to a requirement of $26.8 million for fiscal year 1972. Does this increase reflect the $23.5 million requested for the ULMS program?

Admiral MINTER. Yes, sir; fiscal year 1973 increase over fiscal year 1972 does include the $23.5 million requested for ULMS support.

NAVY/MARINE CORPS AVIATION SUPPORT PROGRAM (INCLUDING AIR TRAFFIC CONTROL AND FLIGHT SAFETY)

The fiscal year 1973 aviation support program funding request is for $91.3 million. Included within this amount are funds for aircraft rearming, meteorological, photographic, weapons range, survival equipment, air traffic control equipment, landing systems and flight safety improvements.

Chairman ELLENDER. How does that compare with 1972 amounts?

Admiral MINTER. That compares to $82.5 million in 1972, sir.

The more significant items for fiscal year 1972 are:

Airborne mine countermeasures	$9.4
Catapult, arresting gear, visual landing aids (VLA)	9.4
Reconnaissance and electronic warfare (EW) support	8.8
Air traffic control and landing improvements	33.3

A brief description of these items follows:

AIRBORNE MINE COUNTERMEASURES

Airborne mine countermeasures funding of $9.4 is included to buy the last six of a 3-year procurement of 20 MK 105 magnetic mine sweeping sleds for airborne towing. This procurement is enabling the Navy to reduce active MSO's from 63 in fiscal year 1969 to a planned level of 10 in fiscal year 1973. We are also requesting funding for one high-performance magnetic sweep for operations evaluation.

Senator YOUNG. Is the $9.4 million requested for airborne mine countermeasures the item set out on line 61 of budget activity 3 of the P–1 exhibit?

Admiral CLANCY. Yes, sir.

Chairman ELLENDER. As I recall, this is part of an effort to use helicopters for the minesweeping mission instead of the minesweeping ships, and as I further recall, this involves a substantial savings in manpower and money. Am I correct about this?

Admiral CLANCY. Yes, sir; you are. Utilizing a relatively small number of minesweeping helicopters and transporting them by C5A to the area where a mine threat exists has given the Navy a highly mobile,

worldwide quick reaction capability with a minimum force. This concept has made it possible to inactivate a significant number of minesweeping ships with an attendant cost savings.

CATAPULTS, ARRESTING GEAR, VLA SUPPORT

The $9.4 include for catapults/arresting gear/VLA support provides $3.3 for the procurement of jet blast deflector equipment and portable fresnal optical landing systems and $6.1 million to update equipment and correct problems encountered in the operation and maintenance of existing equipments.

Chairman ELLENDER. Is this the items set out on line 61 of Budget Activity 3 of the P–1 exhibit?

Admiral MINTER. Yes, sir.

Senator YOUNG. Is this total of $9.4 million for equipment to be installed on your existing aircraft carriers?

Admiral CLANCY. Yes, sir.

Chairman ELLENDER. On line 36, I note a request of $4 million for the support of the Marine Corps short airfield for tactical support and I note on page 5 of the justifications the following statement:

> The fiscal year 1973 program includes $4 million for SATS support as part of a vigorous improvement program to correct deficiencies and to modernize the SATS equipment.

Comment on the nature of these deficiencies in the system and tell us exactly what you are going to do with the $4 million you are requesting.

Admiral CLANCY. These deficiencies exist because expeditionary airfield lighting systems have been worn out through service use and require replacement and because of launching and recovery systems and ancilliary hardware design deficiencies affecting operational safety. The $4 million requested will be used to procure replacement expeditionary airfield lighting systems and for procurement of material for first article testing and service changes for expeditionary airfield launch and recovery systems in service use.

Chairman ELLENDER. What is involved in the request of $1 million set out in line 41 for airfield arresting gear?

Admiral CLANCY. This is a continuing program to provide emergency aircraft arresting equipment for 80 naval and 8 Marine Corps air stations. Funds are requested for the procurement of equipment and first article evaluation. The fiscal year 1973 request will provide for the procurement of 16 high-cycle, high capacity E–28 arresting systems and service change material in support of the E–28 and other airfield arresting systems.

RECONNAISSANCE AND EW WARFARE SUPPORT

The $8.8 million included in the two reconnaissance and electronic warfare items includes $2 million provided for procurement of specialized intelligence collection, readout and analytical equipment for air, surface, and subsurface forces. The remaining $6.8 million is for the naval intelligence processing system (NIPS) which is an integrated tactical shipboard intelligence system to provide the operational commander with the capability to rapidly process, analyze, update and

disseminate tactical intelligence throughout the fleet and to higher commands. NIPS include shipboard tactical intelligence centers for attack carriers, amphibious command ships and fleet commander flag ships.

Chairman ELLENDER. Please provide a tabulation for the record identifying the items included in this $8.8 million for reconnaissance and electronic warfare support by budget activities and line number in the P–1 exhibit.

Admiral MINTER. Yes, sir.

(The information follows:)

Reconnaisance and EW support

[In millions]

BA–LI:	*Fiscal year 1973*
3–47 Direct satellite readout recorder	$2.0
3–58 Naval intelligence processing system	6.8
Total	8.8

AIR TRAFFIC CONTROL AND FLIGHT SAFETY

Admiral MINTER. The $33.3 million is included for Navy and Marine Corps air traffic control and flight safety improvements, funds items such as air traffic control radar beacon systems (ATCRBS), MK XII AIMS (IFF), landing systems and control tower improvements. These items are needed to provide an improved air traffic control and landing capability for our aircraft. They are directly related to and required for a program of placing our aircraft under positive control in order to reduce the hazard of mid-air collisions and generally improve flying safety both ashore and afloat. Also, these efforts are part of the overall program of improving air safety in the Nation's airspace, thereby supporting the air safety programs of the Federal Aviation Administration.

SATELLITE COMMUNICATIONS

The fiscal year 1973 OPN request funds the satellite communications program in the amount of $38.4 million. This is one and a half times as much as spent over the past 2 years indicating the urgent requirement for improvement of long-range fleet communications.

Chairman ELLENDER. Could you state what we are spending in the current year?

Admiral MINTER. Yes, sir; $5.9 million in fiscal year 1972.

In an era when the Navy must continue to operate in a worldwide environment, providing a worldwide secure and reliable satellite communications system is mandatory. Existing modes of communicating with the fleet are seriously deficient in many aspects such as coverage, reliability, security, and capacity. These deficiencies cannot technically or economically be eliminated by further extensive development of the existing means of long-range communications. The fleet satellite communications system, recently approved by OSD for implementation, will provide for significant improvements in the command and control of our fleet forces. The space segment of the program will also

provide a capability to satisfy requirements of certain high priority Air Force users. The major satellite communications items included in the fiscal year 1973 request are: Ship terminals, $24 million; shore terminals, $14.4 million.

A brief description of each follows:

SHIP TERMINALS

Of the $24 million for ship terminals, $13.2 million is required for initial procurement of a newly developed ultra high frequency (UHF) satellite communications (SATCOM) transceiver and its associated antennas. This terminal will be installed aboard approximately 240 of our surface ships and all SSBN's and SSN's for use within the fleet satellite communications system (FLTSATCOM).

The $6.5 million is required for initial procurement of a newly developed fleet broadcast receiver system. This receiver will allow all our surface ships to copy the vital fleet broadcast via FLTSATCOM satellite relay.

The $4.3 million is required to modify the UHF SATCOM transceiver, presently being used in the Joint Tactical Satellite Communication Program (JOINT TACSATCOM) for use in the FLTSAT COM system.

SHORE TERMINALS

Of the $14.4 million for shore terminals, $5.4 million is required for procurement of four [deleted] fleet broadcast keying terminals and 14 UHF SATCOM transceivers. The fleet broadcast keying terminals will be installed at our major communications stations and the UHF transceivers; at ASW tactical support centers. Both are segments of the FLTSATCOM system.

The Navy is responsible for the operation and maintenance of seven earth stations within the defense satellite communication system (DSCS); $9 million is required for the procurement of one newly developed heavy terminal (HT), upgrading the DCS interconnect facilities and procurement of digital multiplexing equipments for all Navy operated earth stations. These procurements are in conformance with the planned expansion of the DSCS into its phase II capability.

Chairman ELLENDER. On line 52 of Budget Activity 3 of the P–1 exhibit, I note a request of $4.2 million for the procurement of photographic equipment. Please comment on the need for this equipment and the nature of the equipment you intend to procure.

Admiral CLANCY. Funds requested are for three distinct procurement functions. The first is local Navy activity procurement of photographic equipment items that are readily available on the commercial market and have been price negotiated on a Federal Supply Schedule by the General Services Administration. Approximtaely $1.5 million is required in this area. The second function is centralized procurement of photographic equipments such as processors, handheld cameras, printers, and other photographic laboratory equipments that are carried in the Navy Supply System and are managed by an inventory manager within the Naval Air Systems Command. Approximately $1.3 million is required in this area, and the third function is centralized procurement of training film productions from

commercial sources. Approximately $1.4 million is required in this area.

All photographic equipment requirements, whether procured by the requiring activity or centrally procured by the Naval Air Systems Command, are screened against surplus photographic equipments of other military services prior to taking procurement action. All nonstandard photographic equipment requirements are reviewed and approved for funding on the basis that a substitute is not carried in the Navy Supply System and the items are essential to the mission of the user. Inventory manager requirements for the Navy Supply System are determined by stock levels and usage rates. The $4.2 million requested covers only essential photographic equipments and training film productions determined to be the minimum needed to satisfy worldwide Navy requirements.

Chairman ELLENDER. Please provide a tabulation for the record identifying each of the items included in the request of $33.3 million for air traffic control and flight safety by budget activities and line number in the P–1 exhibit.

Admiral CLANCY. Yes, sir.

(The information follows:)

Flight safety/ATC

[Units in millions of dollars]

BA–LI and	Item:	*Fiscal year 1973*
2–9	Detection tracking display (SPA–66)	*$.7
2–68	Electronic items under $500,000	3.3
2–69	Test equipment	.9
2–74	TRN–28 ILS	4/1.6
2–75	TSQ–18A LCC	2.0
2–77	UHF transmitter (AN/GRT)	
2–79	GRC (168) VHF	100/.8
2–82	RATTC	
2–83	ATCRBS	5.3
2–84	Control tower improvement program	1.0
2–85	Landing system improvement program	1.5
2–86	Instrument landing system	3/.6
2–89	MK XII (AIMS) IFF	2.6
2–93	SPN–42 T	1/2.9
2–94	SPN–43 pedestals	10/2.0
2–99	Fleet support	
2–130	TSEC/KG–23	83/3.8
2–131	TSEC/KIR–1A	1041/2.5
2–133	TSEC/KIT–1A	1040/1.8
2–134	TSEC/KY–28	
	Total	$33.3

*Portion of line item included relating to flight safety or air traffic control.

Chairman ELLENDER. Are these the items set out in line numbers 123 and 124 budget activity in the P–1 exhibit?

Admiral MINTER. Yes, sir.

ENVIRONMENTAL PROTECTION PROGRAM

The Navy is committed to a major role in preserving and improving our environment. Since 1968, Navy has funded $163 million, principally in MILCON, for pollution-abatement facilities ashore. For this fiscal year $8.1 million for equipment procurement is requested. In all

Navy appropriations our requirements are estimated to be on the order of $1.5 billion through fiscal year 1977, largely for ship sewage disposal and oily waste handling equipment.

Our water pollution abatement program for large ships will commence in fiscal year 1973. The uncertain technology of shipboard sewage treatment units, has resulted in a Navy program of $4 million to move ahead and procure collection, holding and transfer systems hardware for ships as an interim measure, so that sewage and wastes can be transferred to shore sewage disposal facilities.

Also during fiscal year 1973 $1.9 million will be used for heavy-duty oil containment and clean up equipment for spills and ship salvage operations on the high seas. At the same time, $1.7 million will procure oil containment and clean up equipment for oil spills in harbors.

Chairman ELLENDER. Is the $1.9 million you referred to, the item set out as line 14 of budget activity 1 of the P–1 exhibit?

Admiral MINTER. Yes, Mr. Chairman.

Senator YOUNG. Give us some idea of the type of equipment you expect to buy with this $1.9 million.

Admiral SONENSHEIN. We will use these funds to procure such items as containment booms, oil skimmer systems, oil absorption collection systems, salvage ship interim abatement packages, combustion systems, chemical dispersants and chemical herder.

Chairman ELLENDER. You refer to $1.7 million which will procure all containment and cleanup equipment for oil spills in harbors. Is this the item set out as line 6 of budget activity 6 of the P–1 exhibit?

Admiral MINTER. Yes, sir; that is correct.

Senator YOUNG. Just what is the nature of this equipment?

Admiral MINTER. This type equipment is used to provide protection against oil polluting spills in waterfront areas and to retain and recover accidental oil spills. The fiscal year 1973 program provides for procurement of alarms and controls to prevent overflow of oil tanks; oil boom to contain oil spills; and skimmer devices and sorbent systems to remove oil from water.

Chairman ELLENDER. On line 30 of the P–1 exhibit, under budget activity 1, I notice a request of $4 million for the procurement of 40 sewage treatment units. Are these units for installation on ships?

Admiral SONENSHEIN. The $4 million requested in the budget was for the procurement of 40 sewage treatment units for installation on ships. However, it has since been decided to utilize these funds for the procurement of hardware incident to the installation of collection, holding and transfer systems for 25 ships.

SHIP ALTERATION PROGRAM

The fiscal year 1973 ship alteration program request is for $278 million, $2 million less than approved last year. This austere funding has been necessary in order to balance the overall Navy program within available dollars.

The ship alteration program is vital to the fleet. It provides the funds required to install the alterations to the ships by which the fleet is modernized to current mission essential needs.

Chairman ELLENDER. What percentage of this alteration is done in privately owned shipyards?

Admiral MINTER. Your conversion repair and alteration program is split between private and public yards, and Government yards, about 70 percent to 30 percent, but Admiral Sonenshein has more exact figures on this.

Admiral SONENSHEIN. I can add to that by saying the projection for fiscal year 1973 for the dollars that are involved here would give about 34.6 percent to the private yards and the balance to the navy yards.

Admiral MINTER. Exclusive of new ship construction.

Chairman ELLENDER. Just alteration?

Admiral MINTER. Yes, sir; conversion, alteration and repair.

PRIVATE YARDS COSTS

Chairman ELLENDER. Is the cost of alteration in public yards a little more than that in privately owned yards?

Admiral SONENSHEIN. This is a difficult question to answer directly, Mr. Chairman.

Chairman ELLENDER. It does cost more.

Admiral SONENSHEIN. Not necessarily, sir.

Chairman ELLENDER. I thought the record showed that.

Admiral SONENSHEIN. I think you will remember that in about 1962 about 10 years, there were exhaustive studies made both by the Navy using the services of Arthur Anderson, a well-known accountant firm, and by the Shipbuilders Council of America using Ernst & Ernst. At that time, the general conclusion we drew was that in the cost of alterations, which is what we are talking about here, there was essentially a standoff between public and private yards. It was clear new construction was cheaper in private yards. It was basically because of that finding and subsequent cost experience that changed our new construction assignment policy. Beginning with 1967, 100 percent of our new construction projects have been assigned to private yards. This year because of a decrease in size of the active fleet, as we mentioned already, we lost some 300 ships in the last 3 years from our active fleet, going down to 574 from 758. The alterations and repair work to be done has decreased. This has impacted on a particular sector of the private shipyard industry. It is that sector which we call the small and medium sized repair shipyards that deal in non-nuclear work. I am not talking about Newport News. They have plenty of work. Because of this concern, the Shipbuilders Council of America has had a study made which I believe we provided you, by Ernst & Ernst which I believe has been provided to you. This study was just made available to the Navy last Friday about 4 or 5 days ago. We have only had time to make preliminary analysis of it. But I will make a few comments about that, if I may.

I also want to say before doing so that the Navy initiated a study like that about 3 months ago and we expect to have our results in June. We have engaged the services of Booz Allen Applied Research Corp., with the participation of Price Waterhouse, who is also a well-known accounting firm.

ERNST AND ERNST STUDY

Now could I make a few points about the Ernst & Ernst report.

Chairman ELLENDER. By way of comparison?

Admiral SONENSHEIN. Yes, sir.

Chairman ELLENDER. All right.

Admiral SONENSHEIN. The conclusion of the Ernst & Ernst study just recently submitted by the Shipbuilders Council of America, must be reviewed with great caution because the sample taken was quite small and until we have had a chance to analyze the data I would be very cautious about subscribing to it. In any event, they have concluded that the cost of doing the alteration and repair work in the navy yards is in the order of 109 to 124 percent greater than in the public yards. This is based on analysis of manpower rates and the productive hours involved.

As I said a moment ago, we have not had a chance to analyze these carefully but the comparisons on man-hours is a very shallow approach they took one case worked on in one navy yard versus work done in one private yard and from that extended the comparison to the entire country. In my view that is not sufficient.

BOOZ ALLEN CORPORATION—PRICE WATERHOUSE STUDY

Chairman ELLENDER. You say you are in the process of making a study?

Admiral SONENSHEIN. Yes, sir.

The study we are making will cover the ten navy yards and about 14 private yards and will cover some 160 overhauls. When that result is in in June we will be able to answer your question.

ALTERATIONS OR CHANGES IN SHIPS EQUIPMENT

Chairman ELLENDER. Proceed.

Admiral MINTER. These alterations or changes in the ships equipment consist of modernized weapon systems, improved electronic sensors and countermeasures equipment, current communications capability, improved living conditions aboard ship, upgraded damage control capability such as conflagration control aboard carriers, pollution control equipment, and correction of safety, technical, and engineering deficiencies in existing equipment. The ships are also changed to support new weapons systems such as the F–14 and LAMPS. A vigorous and sustained effort to keep the fleet modern must be maintained in the face of the shrinking number of ships in the fleet if the Navy is to be able to counter the growing potential enemy threat in both numbers and capability. The ship alteration program provides this effort.

Because of the long leadtime required to procure these modern sophisticated equipments, the Navy programs its needs in the ship alteration program for 5 years into the future. This programing is done on a ship-by-ship basis with each alteration that is applicable listed against each ship. By this means, those equipments which are being procured this year are scheduled for installation in the future. The leadtime is usually 2 to 3 years. The funds requested this year

for the ship alteration program represent the minimum required to complete the installation of equipments previously procured. Any reduction in those funds will result in equipments remaining in inventory rather than being introduced into the fleet where modernization and improved material readiness is sorely needed.

MAJOR PROGRAMS

Within the funds requested this year, the following major programs will be accomplished:

	Amount
Nuclear alterations	$34.4
LAMPS	12.5
Anti-shipping missile defense 2	22.5
Pollution control	16.8
Aircraft support (F–14)	11.5
Improved fire fighting	9.4
Antisubmarine warfare	20.3
Safety	17.3
Submarine weapons	6.1
Submarine silencing	5.8
Surface missile systems	7.7
Communications and navigation systems	16.8
Habitability improvements	6.3
Conversion to distillate fuel	7.7

NUCLEAR ALTERATIONS

Chairman ELLENDER. Comment generally on the nature of the alterations included in the $34.4 million requested for nuclear alterations.

Admiral SONENSHEIN. The funds requested for reactor plant alterations will be applied to the design, advanced planning, and accomplishment of reactor plant alterations approved by the Director for Nuclear Propulsion. Approved reactor plant alterations incorporate design changes to provide for the continued safe and reliable operation of naval reactor plants and to provide for compatibility of installed equipment with long life cores.

Chairman ELLENDER. The request includes $12.5 million for alterations associated with the LAMPS helicopter program. Comment on the nature of these alterations, and tell us how many and what types of ships are involved.

Admiral SONENSHEIN. Fourteen ships will receive alterations in fiscal year 1973 associated with LAMPS helicopter program, as follows: DEG–1 class: 1 ship; DE–1040 class: 3 ships; DE–1052 class: 10 ships.

Five LAMPS-related ship alterations will be installed on one or more of these ships. They are:

1. To modify existing ship's structures to allow hangaring and protecting of the H–2 helicopter from the elements and to provide additional spares stowage space.

2. To provide shipboard termination of the airborne data link and the processing fo acoustic information relayed by the helicopter from sonobuoys in the water.

3. To provide an aircraft navigational beacon (which can be used by any TACAN-equipped aircraft as well as by LAMPS aircraft).

4. To provide enlarged landing areas, certification of the ship for helicopter operations, night lighting, communications, and helicopter fueling facilities.

5. To provide increased berthing to acommodate LAMPS helicopter detachment personnel.

Chairman ELLENDER. We spent quite a bit of time talking about the antisurface missile defense system. I note that you are requesting $22.5 million for alterations associated with this system. How many ships are involved in this effort?

Admiral SONENSHEIN. There are 11 ships involved in the antiship missile defense (ASMD) system effort; specifically two CG's, one LPH, four DDG's, three DLG's and one CVA.

Chairman ELLENDER. You are requesting $16.8 million for alterations associated with pollution control. How is this related to the request of $4 million for the procurement of 40 sewage treatment units?

Admiral SONENSHEIN. $13.1 of the $16.8 million is for the installation of ship waste water collection, holding and transfer (CHT) systems using hardware being procured with fiscal year 1972 funds. The $4 million to which you refer will be used to procure CHT hardware for installations planned for fiscal year 1974. The remaining $3.7 million in the fiscal year 1973 installation budget is for oil control alterations to reduce oil spills by ships.

F–14 ALTERATION PROGRAM

Chairman ELLENDER. What is involved in the $11.5 million alteration program associated with the F–14 aircraft?

Admiral SONENSHEIN. The $11.5 million figure contains $7.2 million for F–14 aircraft support. New jet blast deflectors (JBD) and versatile avionics shop test (VAST) stands account for $6.4 million of that total. (Parenthetically, the new JBD's also will be required for the S–3 aircraft while the VAST stands will be required for the E–2C as well as the F–14 aircraft.) The remaining $0.8 million will provide engine test stands, ordnance handling equipment, and other support items for the F–14 aircraft.

The balance of the $11.5 million ($4.3 million) is for aviation alterations to ships that are not associated with the F–14 aircraft.

ASW ALTERATIONS PROGRAM

Chairman ELLENDER. Comment generally on the nature of the alterations involved in antisubmarine warfare for which you are requesting $20.3 million.

Admiral SONENSHEIN. The principal alterations to be accomplished under the category of antisubmarine warfare will: (1) correct operational limitations of the AN/SQS–23 sonar by greatly improving [deleted] (2) improve the performance of the AN/SQS–26 sonar by [deleted] and by lowering its maintenance cost; and (3) [deleted].

SAFETY PROGRAMS

Chairman ELLENDER. Give us several examples of the alterations you plan with the $17.3 million requested for safety.

Admiral SONENSHEIN. I will be happy to.
(The information follows:)

Safety alterations are divided into three basic categories: ship safety; personnel safety; and submarine safety. Examples of each are:

SHIP SAFETY

Aqueous Film Forming Foam/Purple K Powder (AFFF/PKP) Conversion of (Aircraft Carrier) Machinery Spaces, $2,860,000.

Programmed to be accomplished on nine aircraft carriers in FY 1973, this alteration is designed to prevent machinery space disasters resulting from oil-fed fires by the introduction of AFFF in addition to PKP as firefighting agents. Alterations similar to this are being installed on many other Navy ships as well.

Ingersoll Rand High Pressure Air Compressor Modification, $164,000.

Programmed for accomplishment on SSN 571, this alteration reduces moisture in air while it is being compressed, improves cylinder lubrication and increases valve life of high pressure air compressors, resulting in reduced maintenance and durability and reliability of equipment vital to submarines.

PERSONNEL SAFETY

Improved Vent in Crews Washrooms, Water Closets and Showers, $97,000.

This alteration is programmed to be accomplished on three DLGs in FY 1973. It will provide a 50% increase in ventilation for two compartments containing a crew's washroom, water closet and showers. Additionally, a fresh air supply and new steam heater will be installed. This alteration will correct deficiencies in sanitary spaces and improve cleanliness.

SHIPALT SSN 291 CO_2 Scrubbers, Improvements to, $467,000.

This alteration will be accomplished on four SSN in FY 1973. It modifies the carbon dioxide removal equipment (CO_2 Scrubbers) installed in these submarines to improve its reliability and increase its capability. Reliable scrubbers of adequate capacity are essential to maintain shipboard carbon dioxide concentrations at or below recommended levels during prolonged submerged (closed boat) operations.

SUBMARINE SAFETY

Aluminum Bronze, $379,000.

Programmed for installation in SSN 566, this alteration replaces aluminum bronze submarine components exposed to sea water that have less than 4% nickel content and are thereby subject to corrosive attack. Accomplishment of this alteration is necessary before a submarine can be certified to operate at design test depth.

Improved Hydraulic Systems Filter, $322,000.

This alteration will be accomplished on four SSN in FY 1973 and consists of the installation of improved hydraulic system filtration units on submarines to achieve greater cleanliness of hydraulic oil. The alteration also will install sampling stations in various locations in submarines to monitor the quality of hydraulic oil to insure that it remains within applicable specifications.

SURFACE MISSILE SYSTEMS ALTERATIONS

Chairman ELLENDER. Comment on the nature of the modifications involved in the request of $7.7 million for surface missile systems alterations.

Admiral SONENSHEIN. 80 percent of this item is for the continuation of the ongoing digital Tartar, digital Terrier, and digital Talos fire control installation programs which began in fiscal year 1971 for Tartar (nine ships have this capability to date), in fiscal year 1972 for Terrier and during the U.S.S. *Albany* modernization in fiscal year 1967 for Talos. The Tartar, Terrier, and Talos digital fire control system reduce reaction time, improve designation accuracies, optimize system tracking equations from search radar data and provide flexibility to better counter air and surface threats than is possible with present analog systems. Eleven percent is for supporting alterations such as

electronics dry air modifications, coolant modifications, et cetera, for the above systems. The remaining 9 percent is for miscellaneous technical improvements to the above equipments.

Communications and Navigation Systems Alterations

Chairman Ellender. Comment on the nature of the alterations involved in the $16.8 million requested for communications and navigation systems.

Admiral Sonenshein. Communications alterations are programed to overcome to the maximum extent possible the principally shortcomings of present communications equipments: incompatibility between amplitude-modulated high-frequency transmitters and receivers on some ships with single-sideband high-frequency equipment on others, and between ships that have voice security equipment with those that don't; insufficient capacity on the part of some ships to copy the multichannel fleet broadcast; and the need for improved security on line-of-sight tactical circuits.

Navigation alterations involve the realinement of carrier-based ships inertial navigation systems (SINS) from an analog to a digital data capability and the providing of hardwired transmission of data to deck outlet boxes (for aircraft use) and avionics shops (for aircraft equipment testing). This modification is required to support the newer aircraft which have digital data capabilities.

Habitability Alterations

Chairman Ellender. What is involved in the request of $6.3 million for alterations associated with habitability improvement?

Admiral Sonenshein. Of the $6.3 million requested for habitability improvements, $3.3 million will be used to improve personnel facilities such as laundries, dry cleaning facilities, lockers, heads, and mess decks. The remaining $3 million is programed for increased air conditioning. Some of the increase in air conditioning will benefit both personnel and equpment. Additionally, some of the air conditioning alterations will provide a central air conditioning system to replace multiple unit air conditioners. The smaller units receive cooling water from the ships fire and flushing system whereas the central air conditioning systems will have integral cooling, thereby freeing the ship's fire and flushing system for its primary purpose.

Distillate Fuel Alterations

Chairman Ellender. Please comment on the request of $7.7 million for alterations associated with the conversion to distillate fuel.

Admiral Sonenshein. These alterations are part of a multiyear effort to convert Navy ships from burning Navy special fuel oil to Navy distillate fuel. This conversion will reduce the number of different kinds of fuel used by today's Navy by permitting boiler, gas turbine, and possible diesel powered ships to burn the same fuel. It also will virtually eliminate Navy dependence on Navy special fuel oil which no longer is a residual product but must be manufactured for the purpose. And finally, it will improve boiler reliability and the

morale of fireroom personnel who must maintain and operate those boilers. The conversion involves modifications to pumps, piping, strainers, sprayer plates, and vents as well as adjustment to the ships' ballast to reflect the weight change in the fuel being used. The total program involves the conversion of 368 ships, of which 115 will be converted with the $7.7 million being requested for fiscal year 1973.

ALL OTHER

Having reviewed the 10 major areas, there still remains 11.8 percent ($239.1 million) of the OPN appropriation which does not lend itself readily to general aggregations as major entities. Although items funded in this area do not lend themselves to categorization within the 10 programs previously identified, they also are vital to the support of the Navy.

Included in these remaining funding requirements are such items as equipments in support of the 1,200 pound steam program, production and plant equipment and dockside equipment to permit ships to go cold iron. This latter is a CNO initiative to improve the sailor's lot in port. Safety and rescue items include: Deep submergence program for submarines; and improved fire-fighting equipment. Other items are Naval Reserve support, small boats and replenishment at sea gear for ships. Finally, vehicular and construction equipments, material handling equipment and literally hundreds of equipments ranging in cost from $1,000 upward for medical oceanographic, navigation, intelligence, and operating forces support are included within these OPN funds.

When you consider that the other procurement, Navy appropriation funds all major equipments and weapons, except aircraft, missiles, and ships and further provides the myriad of minor equipments to support our Navy, the importance of this appropriation takes on added significance. It puts the best available piece of gear in the hands of the user, thus enhancing the Navy's readiness while providing patches to keep our older equipments and ships alive and useful in our modern Navy.

Mr. Chairman, this completes my formal statement.

BUDGET ACTIVITY 1—SHIPS SUPPORT EQUIPMENT

Chairman ELLENDER. The total requested includes $532.4 million for budget activity 1 entitled "Ship Support Equipment." Pages 2, 3, and 4 of the justifications will be included in the record at this point.

(The information follows:)

Budget Activity 1—Ships support equipment

[In thousands]

Fiscal year 1973 estimate	$532,400
Fiscal year 1972 estimate	507,117
Fiscal year 1971 actual	540,898

Purpose and Scope of Work

Budget activity 1 programs include shipboard components, reactor fuel and components, support of the deep submergence program, the small boat procurement program, installation of shipboard equipment in the fleet modernization program, and procurement of production and plant support equipment.

Shipboard components, as well as nuclear components and small boats, are procured for direct installation on active ships as part of a planned maintenance replacement program or as part of an improvement program. These components are also procured to fill authorized stock requirements. Funding for the deep submergence program is aimed at expanding the Navy's capability to live, work, explore and rescue in deep ocean areas. The fleet modernization program includes the installation costs of equipment procured in this budget activity, as well as other budget activities of this appropriation. These equipments provide military and operational improvements for active fleet ships. Production and plant equipment includes new and replacement machine tools and shop equipment for naval shipyard and other industrial activities.

Justification of Funds

Shipboard components (includes P–1 Line items 1–54)

[In thousands]

Fiscal year 1973 estimate	$102,900
Fiscal year 1972 estimate	93,187
Fiscal year 1971 actual	93,760

The funds requested in fiscal year 1973 will provide for a program to improve the active fleet by the introduction of new types of shipboard components and for orderly maintenance and replacement of existing equipments. These funds will also provide for the orderly replacement of batteries on conventional submarines.

Submarine batteries—$2.5 million. (P–1 line items 1–5).—The majority of the batteries being procured are to fulfill the normal replacement requirement for the conventional submarine force. A small portion of this request is for batteries to be used as a secondary power source for nuclear submarines.

Spares and repair parts—$47.6 million. (P–1 line item 6).—Approximately 100,000 different equipments are procured under this program. However, not all are procured in any 1 year. Requirements are determined by computations based on stock on hand, equipment population and previous and projected issues. Examples of specific items included are boiler parts, small ship propellers, small motors and propulsion shafts. The funds requested in fiscal year 1973 will provide for an acceptable level of system effectiveness.

Hull, machinery, and electrical equipment—$44.7 million. (P–1 line items 7–50 and 54).—This program consists of components required for replacement and maintenance support of equipment presently installed in the fleet, and ship alteration type items which incorporate new military and operational developments into the active fleet ships. Fiscal year 1973 maintenance funding is requested to procure such items as air compressors, pumps, propellers for aircraft carriers, and [deleted] propellers for submarines. [Deleted.] Alteration funding includes vital improvements in such areas as underway replenishment, submarine silencing and sewage treatment plants for large surface ships. Sewage treatment plants, which enable ships to incinerate solid matter and purify liquid matter, will provide an urgently required capability to offset water pollution problems.

Training equipment—$8.1 million. (P–1 line items 51–52).—Included in this program are the requirements for a variety of equipments used for training purposes at the various Naval training activities. The fiscal year 1973 request includes equipment for a nuclear training facility and equipments to support new ships in the Active Fleet.

Nuclear cores and components (includes P–1 line items 55–62)

[In thousands]

Fiscal year 1973 estimate	$127,900
Fiscal year 1972 estimate	115,900
Fiscal year 1971 actual	163,200

The fiscal year 1973 request provides primarily for procurement of replacement longer life power units and related instrumentation and control equipment for an increasing number of submarine and surface ships scheduled for refueling in 1975 and later. Procurements are phased to provide delivery of fuel and components to specific nuclear powered ships officially scheduled for overhauls and refueling in future years. New equipment [deleted] will continue to be procured for installation in submarines scheduled for overhauls during 1974 and 1974.

Deep submergence program (includes P–1 line items 63–74)

[In thousands]

Fiscal year 1973 estimate	$6,600
Fiscal year 1972 estimate	4,300
Fiscal year 1971 actual	14,700

The fiscal year 1973 request consists principally of equipment for maintenance training, homeport equipment, operational support equipment, test equipment, and equiment alterations for the rescue program. Also funded are ocean engineering equipment and aquanaut training equipment for the man-in-the-sea program, equipment alterations for the integration and control (I. & C.) subsystem for the underwater research and ocean engineering vehicle, NR–1, and alterations to equipment relating to submersible and personnel safety, habitability, and overall operational performance of deep submergence vehicles.

Procurement of small boats (includes P–1 line items 75–80)

[In thousands]

Fiscal year 1973 estimate	$3,600
Fiscal year 1972 estimate	3,100
Fiscal year 1971 actual	6,363

The funds requested in fiscal year 1973 will provide for the procurement of new boats to replace obsolescent and non-repairable boats of the active fleet as well as patrol boats for coastal patrol squadrons.

Fleet modernization program (includes P–1 line item 81)

[In thousands]

Fiscal year 1973 estimate	$278,000
Fiscal year 1972 estimate	280,200
Fiscal year 1971 actual	238,885

The fiscal year 1973 request will provide for a modest number of improvements to active fleet ships. Some major equipment installations include light airborne multipurpose systems (LAMPS), antiship missile defense systems, jet blast deflectors for F–14 aircraft, AN/SQS–26 sonar domes and submarine silencing equipment. Other planned alterations include habitability improvements, oil pollution and sewage abatement programs, distillate fuel conversions and ship safety improvements.

Production and plant equipment (includes P–1 line items 82–85)

[In thousands]

Fiscal year 1973 estimate	$13,400
Fiscal year 1972 estimate	10,430
Fiscal year 1971 actual	23,990

The fiscal year 1973 request will provide funds for the procurement of industrial production equipment necessary to improve and modernize the naval shipyards and provide for the replacement and improvement of equipment at inactive ship maintenance facilities, naval ship engineering center field divisions, and degaussing stations. The Shipyard Modernization Program is funded at $11.8 million for procurement of industrial plant equipment (machine tools, cranes, and shope equipment) and technical collateral equipments in support of military construction projects. Also included is $1.6 million for other production and plant equipment, principally for the Portsmouth Naval Shipyard and the Naval Ship Engineering Center field divisions.

SHIP SUPPORT EQUIPMENT FINANCING

Chairman ELLENDER. According to my figures, $479.1 million of the total request of $532.4 million for ship support equipment has been discussed in connection with the 10 categories set out in your statement, as follows: Antisubmarine warfare, $17.4 million; spares and repair parts, $47.6 million; nuclear support, $127.9 million; fleet bal-

listic missile support, $1.9 million; environmental protection, $6.3 million; and ship alterations, $278 million. This leaves a balance of approximately $53 million which has not been discussed. Are my figures correct?

Admiral MINTER. Yes, sir; you are correct.

INSHORE WARFARE EQUIPMENT

Senator YOUNG. On line 21 of the P–1 exhibit, there is a request of $1.1 million for the procurement of Naval inshore warfare equipment. Please comment on the nature of this equipment.

Admiral SONENSHEIN. These funds will provide for the procurement of such items as: diving equipment, obstacle avoidance sonar, and doppler navigation sonar. This equipment is used by such Navy shore based units as special warfare groups, Naval beach groups, explosive ordnance disposal groups, and inshore undersea warfare groups.

STEAM SYSTEM EQUIPMENT

Chairman ELLENDER. On line 31 of the P–1 exhibit, there is a request of $2.8 million for the procurement of 1,200 p.s.i. steam system equipment. Is this the equipment you referred to in your statement in connection with the program to permit ships to go cold iron?

Admiral SONENSHEIN. No, sir; it is not.

Senator YOUNG. Just how is this equipment used?

Admiral SONENSHEIN. The funds requested here are for the procurement or modification kits designed to improve the performance and reliability of the 1,200 p.s.i. steam systems currently installed in ships.

FIRE FIGHTING EQUIPMENT

Chairman ELLENDER. Please comment on the request for $2.3 million for improved fire fighting equipment set out as line 33 of the P–1 exhibit.

Admiral SONENSHEIN. These funds are for the procurement of fire fighting equipment to be installed in machinery spaces aboard ships. Specifically, this system uses aqueous film forming foam, sometimes called light water, dispensed through hard hoses from flow-through reels in the machinery spaces. On the same reel is a supply of purple K dry chemical powder, the most effective extinguishing agent for oil spray fires.

Chairman ELLENDER. Is all of this equipment to be used aboard ship?

Admiral SONENSHEIN. Yes, sir; it is.

OTHER TRAINING EQUIPMENT

Chairman ELLENDER. On line 51 of the P–1 exhibit, there is a request of $8.1 million for the procurement of "other training equipment." Comment generally on the nature of this equipment, and please provide a statement for the record listing each of the items included in this $8.1 million request.

Admiral SONENSHEIN. These are hull, mechanical, and electrical equipments intended for installation in various Navy schools for training operator and maintenance personnel. They are in support of identical equipment introduced into the fleet through the shipboard modernization program. The $8.1 million requested will provide for the procurement of the following equipment list that I will insert in the record.

(The information follows:)

Item:	*Amount (thousands)*
Forced draft blowers	$555
Switchboard	80
Oxygen-nitrogen generating plant	360
175-ton air-conditioner	85
Unrep system training equipment	708
NC 2 plotter	6
RD–219 recorder-reproducer	5
Synchro repeater	5
1,200 p.s.i. steam plant support equipment	851
Nuclear steam plant equipment	4,660
Support and adaptive equipment	700
Total	8,100

MISCELLANEOUS HULL, MACHINERY, AND ELECTRICAL EQUIPMENT

Senator YOUNG. On line 54 of the P–1 exhibit, I note a request of $8 million for the procurement of hull, machinery, and electrical items under $500,000. Give us several examples of the types of equipment you expect to procure with these funds.

Admiral SONENSHEIN. I will be happy to. Some of the types of equipments to be procured with these funds are: secondary propulsion motors, pumps, propellers, motor generators, diesel engines, control equipment, winches, and shafts.

DEEP SUBMERGENCE PROGRAM

Chairman ELLENDER. $6.6 million is requested for the procurement of equipment to support the deep submergence program. These items are set out in lines number 63 through 74 of the P–1 exhibit. I wish you would provide a tabulation for the record setting out the funding of the deep submergence program from all Navy appropriations for fiscal years 1971, 1972, and the request for 1973.

Admiral SONENSHEIN. I will be happy to.

(The information follows:)

[In thousands of dollars]

Appropriation	Fiscal year—		
	1971	1972	1973
R.D.T. & E.N	5,190	3,989	3,030
OPN	14,700	4,300	6,600
O. & M.N	9,336	8,038	8,118
Total	29,226	16,327	17,748

Chairman ELLENDER. Of the total of $6.6 million requested for the deep submergence program, $1.1 million is for ocean engineering equipment. Comment on the nature of this equipment.

Admiral SONENSHEIN. The funds requested will provide for the procurement of equipment associated with the deep dive system being utilized to train Navy divers who will require extensive training in the saturation diving system. These divers are currently utilizing operational aquanaut equipment which, through extensive use, has a relatively short life expectancy. Examples of these equipments are: aquanaut umbilicals, gas sensors and monitors, diver heating equipment, communications equipment, motors, breathing bags, and gas regulators and bottles.

NR–1 EQUIPMENT

Chairman ELLENDER. What is involved in the request of $400,000 for NR–1 equipment?

Admiral SONENSHEIN. These funds will provide for the procurement of equipment to either correct known operational deficiencies or to enhance the vessel's search and recovery capability. Examples of some of these are: Improvements in navigation capability and viewing system under conditions of low visibility.

DEEP SUBMERGENCE VEHICLES

Senator YOUNG. Please comment on the request of $0.8 million for deep submergence vehicles.

Admiral SONENSHEIN. These funds will be used to procure new equipment for the U.S.S. *Dolphin*, and the deep submergence vehicles *Trieste II*, *Turtle* and *Sea Cliff*. Examples of the types of equipment to be procured are: diesel exhaust valves, air conditioning equipment and improved underwater lights and cameras.

RESCUE EQUIPMENT

Chairman ELLENDER. Of the $6.6 million requested for the deep submergence program, $4.3 million is for rescue program equipment. Please comment on the nature of this equipment.

Admiral SONENSHEIN. Equipment procured in this program falls into (5) major categories. These are: (1) Equipment for training of military personnel and modifications to existing training equipment to insure configuration capability; (2) maintenance and overhaul equipments to tactical equipment to insure minimum downtime of systems; (3) system replenishment equipment required to update system effectiveness and correction of operational deficiencies; (4) homeport replenishment equipment and alterations required by the rescue system test facility and San Clemente Test Range; and (5) alternate mission equipment required to modify the deep submergence rescue vehicles to incorporate search mission capability.

PROCUREMENT OF SMALL BOATS

Chairman ELLENDER. $3.6 million is requested for the procurement of small boats as set out in lines number 75–80 of the P–1 exhibit. Of this total, $2.3 million is for the procurement of small boats designated "standard." Please comment on the types of boats you expect to procure with these funds and the number you expect to procure.

Admiral SONENSHEIN. These funds will provide for the procurement of the following boats:

Type:	Quantity
14-foot punt	25
18-foot utility	31
26-foot motorwhale boat	26
26-foot personnel	15
33-foot utility	15
40-foot utility	5
40-foot personnel	5

COMBATANT CRAFT

Chairman ELLENDER. This total includes $1.2 million for the procurement of combatant craft. Please describe these craft.

Admiral SONENSHEIN. The combatant craft referred to here are patrol craft with the following characteristics:

Length	65 feet.	Hull material	Aluminum.
Beam	16 feet.	Speed	20 knots.
Engines	2 diesel.	Crew	6.

RIVERBOATS FOR VIETNAM

Senator YOUNG. Of the total, $100,000 is requested for procurement of small boats for the support of free world forces. Comment on the nature of these boats and indicate the countries that they are being procured for.

Admiral SONENSHEIN. The funds requested here are for the procurement of 2 river patrol boats for Vietnam.

SHIPYARD MODERNIZATION

Chairman ELLENDER. I note on line 82 of the P–1 exhibit a request of $11.8 million for shipyard modernization. Is this a part of the planned $1.1 billion shipyard modernization program?

Admiral SONENSHEIN. Yes, sir; this is part of that program.

Senator YOUNG. How much progress has been made on this 10-year modernization program?

Admiral SONENSHEIN. We have not made the progress we envisioned when the original program was developed by the Navy. However, significant progress in modernization has been possible, but much remains to be done. A few examples of modernization improvements which have been accomplished are:

Drydock improvements; upgrading of utilities and pumping facilities; general upgrading of waterfront utilities; new industrial production shop facilities and equipments (these include sheet metal, structural, pipe, machine and other basic production shops); new engineering management facilities; and upgrading of obsolete machine tools and equipment by replacement with high productivity models.

SHIPYARDS AND EQUIPMENT

Chairman ELLENDER. Please provide a tabulation for the record giving a breakdown by the various shipyards and types of equipment to be procured.

Admiral SONENSHEIN. Yes, sir. I will be happy to provide that.
(The information follows:)

[In thousands of dollars]

Shipyard	Machine tools	Shop equipment	Test equipment	Other technical collateral	Other plant equipment	Total
Boston	33.0	395.3	173.0	0	165	766.3
Philadelphia	0	719.8	123.0	295.0	189	1,326.8
Norfolk	72.5	452.5	200.0	169.1	200	1,094.1
Charleston	70.8	574.0	100.0	110.0	200	1,054.8
Long Beach	164.4	281.0	400.0	9.3	166	1,020.7
Hunters Point	6.7	218.6	229.9	0	200	655.2
Mare Island	0	1,833.1	100.0	1,800.0	226	3,959.1
Puget Sound	0	198.6	100.0	201.5	264	764.1
Pearl Harbor	0	594.9	100.0	364.0	100	1,158.9
Total	347.4	5,267.8	1,525.9	2,948.9	1,710	11,800.0

TEN-YEAR SHIPYARD MODERNIZATION PROGRAM

Chairman ELLENDER. With respect to the 10-year program, please update the tabulations appearing on page 643 of last year's hearing.

Admiral SONENSHEIN. Yes, sir. The tables submitted for the record last year and which I will again provide, still reflect the 10-year planned shipyard modernization program for a total cost of $1,053.5 million. However, the Navy is now reviewing the naval shipyard base structure that will best support known fleet requirements. This effort, now underway, with anticipated completion by November 1972, will require a subsequent update of the shipyard modernization program.
(The information follows:)

SHIPYARD MODERNIZATION 10-YEAR PROGRAM (FISCAL YEARS 1970-79) BY APPROPRIATION

[In millions of dollars]

Appropriation	Fiscal year— 1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	Total
Military construction	59.4	96.4	120.5	102.6	92.1	58.8	79.6	63.7	49.4	46.9	769.4
Other procurement, Navy	24.5	34.2	26.0	24.0	16.7	15.5	12.3	13.1	12.2	13.5	192.0
Operation and maintenance, Navy	5.5	14.0	14.5	13.9	12.7	10.6	7.9	6.0	4.0	3.0	92.1
Total	89.4	144.6	161.0	140.5	121.5	84.9	99.8	82.8	65.6	63.4	1,053.5

Admiral SONENSHEIN. However, as illustrated in the chart, I will also include in the record, adjustment to the approved fiscal years 1970, 1971, 1972, and the fiscal year 1973 program now before Congress for approval indicates serious delay for modernization as planned.
(The information follows:)

SHIPYARD MODERNIZATION, BY APPROPRIATION

[In millions of dollars]

Appropriation	Fiscal year— 1970	1971	1972	1973
Military construction	49.9	28.9	13.7	22.5
Other procurement, Navy	20.3	20.3	9.7	11.8
Operation and maintenance, Navy	1.5	2.2	1.7	11.0
Total	71.7	51.4	25.1	35.3

Admiral SONENSHEIN. The foregoing funding deficiencies negate the possibility of accomplishing modernization in accordance with the approved schedules. The drastic reduction in funding of this carefully engineered program in the early years will require rescheduling of hardcore, time-sensitive facilities and equipment to "out" years. The naval shipyard modernization program was planned as a 10-year program to correct a total deficiency in facilities for MCON at $769 million. Ten years was considered the optimum modernization period considering investment rate, construction disruption, and workload requirements.

SHOP EQUIPMENT

Chairman ELLENDER. Please comment on the request of $800,000 for the procurement of shop equipment.

Admiral SONENSHEIN. Yes, sir. The funds requested provide industrial plant equipment—shop equipment—required for replacement and capability increase items for the Naval Shipyard Portsmouth, $467,000; Naval Ship Engineering Center Field Division, Philadelphia, $209,000; and the Navy Experimental Diving Unit, $124,000.

MISCELLANEOUS EQUIPMENT

Chairman ELLENDER. I note on line 85 of the P–1 exhibit a request of $800,000 for the procurement of the "Other support equipment under $500,000." Give us several examples of the types of equipment you plan to procure with these funds.

Admiral SONENSHEIN. Yes, sir. This request provides funds for other plant equipment items costing between $1,000–$2,500 at Portsmouth Naval Shipyard, $324,000; Naval Ship Engineering Center Field Division, Philadelphia, $92,000; and Navy Experimental Diving Unit, $76,000; also machine tools for Navy Experimental Diving Unit, $8,000; and degaussing equipment required as a result of technological advances in the ship types being serviced at naval stations, $300,000.

COMMUNICATIONS ELECTRONICS EQUIPMENT

Chairman ELLENDER. The total requested for "Other Procurement, Navy," includes $456.3 million for the budget activity entitled "Communications and Electronics Equipment" pages 2 through 11 of the justifications will be included in the record at this point.

Budget activity 2—Communications and electronic equipment

[In thousands]

1973 estimate	$456,300
1972 estimate	352,200
1971 actual	311,233

Purpose and Scope of Work

Budget activity 2 programs include the procurement of all shipboard and shore communications and electronics equipment. The first sub-activity, Ship Electronics Equipment, provides shipboard electronic equipment for the Active Fleet and training activities. Anti-Submarine Warfare Electronics equipment furnishes surface ships, submarines and special shore activities with equipment used for detection, tracking, localization and classification of submarines. Electronics equipments procured by the Strategic Systems Project Office are special sonars employed only in Fleet Ballistic Missile submarines. Electronics equipment under

the cognizance of the Reconnaissance, Electronic Warfare, Special Operations and Naval Intelligence Processing Systems Project Office (REWSON) provides the fleet the capability of [deleted] for the purpose of executing an effective surveillance and intelligence collection capability. The final sub-activity, Communications and Electronics includes communications equipment for Active Fleet Ships, worldwide shore facilities and electronics equipment for fleet support, continental shore and harbor defense activities.

Justification of Funds

Ship electronic equipment (includes P–1 line items 1–25)

[In thousands]

1973 estimate	$106,300
1972 estimate	74,566
1971 actual	54,090

The funds requested in fiscal year 1973 will provide for increased emphasis upon new radar procurement and improvements to existing radars, increased training requirements for new ships, and will continue to provide adequate support for electronic spares and repair parts.

Command and Combat Direction System—$8.4 million (P–1 line 1).—The fiscal year 1973 request continues funding for the Naval Tactical Data System (NTDS), now installed on major warships, that allows the tactical commanders to perform their combat functions both accurately and quickly. This request will provide for the procurement of additional components to upgrade existing installations, field changes for the data display system and modifications to existing components to meet tactical air control and tactical air defense systems requirements.

Anti-Air Warfare—$30.6 Million (P–1 line items 2–12).—The Anti-Air Warfare program provides the Active Fleet with detection, tracking and identification equipment to meet the challenge of high speed attack capabilities of modern aircraft. The Fiscal Year 1973 request reflects continued emphasis on improving equipment reliability and maintainability and improving operations in poor weather and countermeasures environment. Modifications to improve the reliability and performance of air search radars such as the AN/SPS–48 and the AN/SPS–40, and procurement of new surface search radars (AN/SPS–58), and new modifications that are designed to [deleted] are among the programs funded in this subactivity.

Communications Afloat—$6.0 Million (P–1 line items 13–16).—The communications equipments procured in this program are principally shipboard integrated antenna systems for both ASW and FBM submarines to permit more communication flexibility and greater maneuvering freedom. The request in FY 1973 will provide [deleted] antennas, [deleted] communications [deleted] and will continue the modification to the existing FBM communication [deleted] system.

Navigation and Detection—$.8 Million (P–1 line item 17).—The Navigation and Detection program provides the Active Fleet with electronic equipment for navigation and surface detection. Operational improvements to the Fleet have been in the form of field change kits to existing surface-search radars such as AN/SPS–10, AN/SRN–9, and AN/BPS–12 on both surface ships and submarines.

Electronic Spares and Repair Parts—$42.7 Million (P–1 line item 18).—This line item funds electronic repairable and initial provisioning items, including their replenishment, for ships of the Active Fleet. More than 100,000 items are involved though not all are procured within any one single year. Requirements are determined by computations based on stock on hand, equipment population, and previous continuation of a reasonable supply system effectiveness. The FY 1973 funds requested will provide a satisfactory level of supply effectiveness.

Close Contact and Emergency Communications Sonar—$.5 Million (P–1 line item 19).—This activity finances those equipments whose sole purpose is to search out and locate mines in harbor and coastal areas. The funds requested in FY 1973 will provide for partial implementation of the AN/SQQ–14 mine hunting sonar improvement program.

Transportation to First Destination—$1.7 Million (P–1 line item 20).—First Destination Transportation is the movement of material procured under this budget activity from the contractors' plants to the first point of storage or use within the Naval Establishment where such movements are not included in the procurement contract. This requirement remains fairly constant from year to year.

Training Equipment—$15.6 Million (P–1 line items 22–25).—These funds will procure training equipment in support of new equipments being introduced into the Active Fleet through the shipbuilding program. It is imperative that personnel be fully trained to operate these new equipments, not only for the first ship being delivered, but for subsequent training of crews for follow-on ships. The types of equipments and system to be procured are Command and Control equipment, AN/SQS–26 Modification Kits and Central computer complex equipments.

Electronic equipment—ASW (includes P–1 line items 26–39)

[In thousands]

Fiscal year 1973 estimate	$75,500
Fiscal year 1972 estimate	76,075
Fiscal year 1971 actual	47,354

The Fiscal Year 1973 estimate reflects the continued support required to provide an increased capability to meet the existing undersea threat. Primary emphasis is to improve surface and submarine sonars and provide state-of-the-art new systems for surface ships and submarines. Of vital importance is the procurement of effective ASW countermeasures devices by the inclusion of the NIXIE [deleted] System for surface ships and the [deleted].

AN/SQS–26 Improvements—$4.0 Million (P–1 Line Item 26).—This program provides for procurement of a series of kits to respond to fleet needs by correcting known and emergent deficiencies in the SQS–26 Surface Sonar. These changes are keyed to improvements in operational performance, [deleted].

AN/SQS–26 Rubber Acoustic Window—$3.9 Million (P–1 Line Item 27).—The wire-reinforced, pressurized, rubber acoustic window will replace the SQS–26 steel sonar dome window. It will significantly improve sonar performance by [deleted] lower maintenance costs. Since these windows will be installed during regular overhaul, FY 1973 requirements correspond to shipyard availability of the applicable ships.

AN/SQS–26 Shipboard Trainer—$3.5 Million (P–1 Line Item 28).—This equipment is capable of recording a tactical sonar search and track situation as it normally occurs in the ocean. The playback of such recorded information will permit all SQS–26 equipped ships and sonar schools to share in the varied sonar experience of recording ships, and provide a "live" submarine target for complete and realistic operator and team training in detection, classification and attack. In addition, the recorded information will be used to evaluate sonar crew performance when the sonar problem is recreated. The FY 1973 request provides for funding of 27 Trainers as the second year procurement in a two year multi-year contract.

AN/SQS–23 Sonar—$25.4 Million (P–1 Line Item 29).—The major item of procurement is the Performance and Integration Retrofit (PAIR) to the AN/SQS–23 Surface Sonar. [Deleted.] The FY 1973 request will fund 18 PAIR systems as the third multi-year procurement quantity, on-going support for the operational SQS–23 (TRAM), and continued [deleted].

Expendable BT's (Submarine)—$1.4 Million (P–1 Line Item 30).—The submarine Expendable Bathythermograph System measures ocean temperature profiles to provide the best operating depth for sonar detection and/or evasive action. The Expendable BT provides major improvement over the current mechanical BT by [deleted]. The FY 1973 request provides for procurement of 33,000 expendable probes and shipboard installed launchers and recorders.

Submarine Acoustic Warfare System (SAWS)—$4.5 Million (P–1 Line Item 32).—The Submarine Acoustic Warfare System will provide [deleted].

NIXIE—$4.7 Million (P–1 Line Item 33).—NIXIE is a [deleted]. The FY 1973 buy consists of 37 NIXIE systems to be installed aboard fleet escort type ships.

TASS—$15.7 Million (P–1 Line Item 34).—[Deleted.]

Sub [deleted] *Sonar—$2.9 Million (P–1 Line Item 35).*—[Deleted.]

AN/BQQ–1 Ret III—$3.1 Million (P–1 Line Item 36).—The AN/BQQ–1 Ret III provides a major improvement to the AN/BQQ–2 Integrated Submarine Sonar System. [Deleted.] The FY 1973 request will provide associated support items for Ret III systems previously procured.

Sonar Switches and Transducer Components—$2.1 Million (P–1 Line Item 38).—This program provides major ASW sonars with replacement transducers, cables and scanning switches for installation aboard surface ships and sub-

marines. The FY 1973 requirement consists of transducer procurements for the SQS–26, SQS–35 and the SQS–23 surface sonars.

Items Under $500K—$4.3 Million (P–1 Line Item 39).—This line item is an aggregation of various minor procurements in support of major ASW systems. These procurements provide for the correction of deficiencies in fleet material and, consequently, have a direct bearing on ship sonar readiness. The FY 1973 request provides for a realistic program to correct identified problems and procure necessary materials in support of the ASW mission.

Electronic equipment, Rewson (includes P–1 line items 40–61)

[In thousands]

Fiscal year 1973 estimate	$45,800
Fiscal year 1972 estimate	23,885
Fiscal year 1971 actual	37,371

The Reconnaissance, Electronic Warfare, Special Operations, Naval Intelligence Processing Systems Project Office (REWSON) provides the Fleet, on a "Quick Reaction Capability" (QRC) basis, with electronic systems capable of [Deleted]. These systems are vital for Force Commanders to execute tactical control. [Deleted] collected utilizing these systems provides much of the information necessary to understand the potential enemies' military equipment and permits the United States to develop effective counters to it. Information gathered through these systems ranges from the design and performance of ships and submarines to enemy missiles so that effective counters can be devised [Deleted]. The funds requested in FY 1973 will provide for accelerated procurement of [Deleted] to meet present and anticipated requirement.

Electronic equipment—SSPO (includes P–1 line items 62–64)

[In thousands]

Fiscal year 1973 estimate	$11,000
Fiscal year 1972 estimate	5,900
Fiscal year 1971 actual	1,000

AN/BQR–19 $2.4 million (P–1 line item 63).—The AN/BQR–19 sonar provides for [Deleted].

A total of 44 AN/BQR–19 [Deleted] Sonar Systems will be procured of which 41 are required for tactical use and three for fleet training. Equipment installation aboard SSBNs will be accomplished at scheduled ship conversions or overhauls or at tenderside availabilities. Equipments to be installed at training sites must be available to have personnel thoroughly trained on tactical equipment prior to scheduled ship deployment.

AN/BQR–15 [Deleted] $8.6 million (P–1 line item 64).—The AN/BQR–15 is a new sonar system to be introduced as an addition to the existing FBM sonar capability. This new system will [Deleted].

A total 45 AN/BQR–15 Sonar Systems are required for SSBN's (41), fleeting training (3) and configuration control (1). Installation of the 41 ship systems will be accomplished at scheduled conversions and overhauls insofar as schedules permit and also at restricted availabilities (RAVs) as equipment are available. Equipments to be installed at the three FBM refresher training sites must be available to allow for personnel thoroughly trained on tactical equipment prior to scheduled ship deployment.

Communications and electronic equipment (includes P–1 line items 65–148)

[In thousands]

Fiscal year 1973 estimate	$217,720
Fiscal year 1972 estimate	171,774
Fiscal year 1971 actual	170,518

The request for Fiscal Year 1973 provides for continued procurement of communciations and electronics equipment required for fleet and shore use. Emphasis continues on funding the CAESAR program and increased efforts are reflected in the Fleet Satellite Communications programs.

CAESAR—$71.8 Million. (P–1 line item 65).—Project CAESAR is the [deleted].

ASW Centers Command Control System—$7.2 Million.—(P–1 line item 66) This program provides all ASW commanders with the [deleted]. The FY 1973 resources are for the [deleted] of ASW Center Command Control System.

Test Equipment—$3.3 Million. (P–1 line item 69).—This centrally managed program provides specialized and general purpose electronic test equipment to meet a variety of requirements for ship and shore activities. Examples of these equipments are oscilloscopes, digital voltmeters, spectrum analyzers, radar test sets, signal generators, etc. These test equipment items are required for support of prime electronic weapons, electrical, interior communications, fire control, and air navigational aids systems for Shore, Aviation and Shipboard activities.

Test equipment procured under this line item is for replacement of obsolete, worn out and defective equipments that support existing electronic installations throughout the Naval establishment and to meet testing requirements on new equipments and systems.

Shore Electronic Support Equipment—$9.9 Million. (P–1 line items 67–68; 70–72).—This Program provides communications/electronics equipments to CNO commanded activities and shore-based commands of the Fleets and Operating Forces. These equipments support communications/electronics projects at operational shore activities, assure compliance with TEMPEST transmission security requirements, replace deteriorating and obsolete equipments, reduce repairs and maintenance manhours, and decrease operational communications downtime and failures at Commands (Fleet, Force, and Type Commanders) and Fleet Technical Activities that directly support the Operating Forces.

Remote Sensors (Formerly DCPG)—$2.5 Million. (P–1 line item 73).—Funding in this program is for the procurement if Intrusion Detection Sensors for Amphibious, Airstrike, Special Warfare, Marine Corps Operational, Base Physical Security/Arms Room, and for Fleet Operational/Training conceptual exercises. Included are acoustic, seismic, and magnetic detectors and related monitor equipment.

Aviation Ground Support Equipment—$12.8 Million. (P–1 line items 74–75; 77–79; 82–86).—Included in this program is material support for systems providing aid to air navigation, tactical communications, mobile air traffic control systems, FM communications, special instrumentation systems, and associated test and ancillary equipment at Naval and Marine Corps aviation shore activities in both the continental United States and overseas. These items fulfill current realistic operational requirements at Naval and Marine Corps activities with the latest available models.

Miscellaneous Support Programs—$11.4 Million. (P–1 line items 87; 93–99).—These funds will support several programs including radio navigation equipment, information and education systems, and radiation detection equipments required for ships and shore activities.

Naval Reserve Equipment—$2.1 Million. (P–1 line item 88).—This program will provide for modernized electronic equipment in support of training for the Naval Reserve Forces. Equipment is provided for fourteen (14) Reserve Security Groups at Naval Reserve Stations, and surface search radar systems (with communication links) and other communications and electronics equipment are planned for Reserve Mobile Inshore Undersea Warfare Teams.

Mark XII (AIMS) IFF—$2.6 Million. (P–1 line item 89).—The AIMS program is a tri-service program designed to provide universal air traffic control radar beacon systems comparable with the National Air Space Program and a secure identification system for military use. It also provides altitude reporting, security, increased range and frequency stability, side lobe suppression, and improved response time. The Fscal Year 1973 is part of a phased program to outfit major combatant and selected auxiliary ships of the active fleet.

OMEGA—$7.2 Million. (P–1 line item 100).—The Fiscal Year 1973 request will provide submarine receivers, antenna and shelters (Trinidad) and services required for design and installation of world-wide, all-weather, continuously-operating, VLF navigation system. The system when completed will provide positive position fixes for ships, submarines and aircraft.

Communications Equipment (Shipboard)—$5.8 Million. (P–1 line items 101–109).—The Fiscal Year 1973 request is a continuation of effort to provide responsive communications capabilities to the active fleet. The program will provide equipment to transmit and receive in various modes (UHF, VHF, HF). It will also fund procurement of simplex and duplex teletype and multi-channel broadcast systems. Antennas and other related components are included in addition to primary communications equipment.

Communications Equipment (Ashore)—$9.5 Million. (P–1 line items 110–122).—This program provides Shore Communications Equipment to meet world-wide Naval Shore Communications requirements. The Fiscal Year 1973 request reflects a continuation of the phased program to provide a balanced and responsive communication system and will provide Naval support to the DCS for DCS Entry Stations and Secure Voice Programs, equipment in support of the ASW Tactical Support Centers and continuation of the Navy's participation in the tri-Service Automatic Digital Information Network.

Satellite Communications—$38.4 Million. (P–1 line items 123–125).—The Fiscal Year 1973 request will fund procurement of ship terminals to operate with the Navy Fleet SATCOM System (FSCS) and provide the capability of satisfying the Navy commitment to the Defense Satellite Communications System (DSCS). Funds are also included for procurement of Navy SATCOM Shore Terminals which will operate within the DSCS and the uplink for the Navy Fleet Broadcast System within the Navy FSCS.

Special Communications (SPECOMM)—$14.3 Million. (P–1 line items 126–128).—This program provides for the procurement of communications equipment for ship-to-shore and shore-to-ship transmission for Command and Control of the Fleet Ballistic Missile Submarine Forces. The FY 1973 program will continue the procurement of VERDIN equipments for installation in the SSBN's, FBM tenders and selected shore stations, and begin procurement of equipment for SS/SSN's. [Deleted.] The procurement of SECT (Submarine Emergency Communications Transmitter) which provides equipment which automatically transmits signals to strategic Commanders and rescue forces in the event of a submarine casualty will also be continued.

Cryptographic Aids and Devices—$10.7 Million. (P–1 line items 129–139).—The Fiscal year 1973 request provides for the procurement of Cryptographic Aids and Devices to meet the requirements of the operating forces and the shore establishment. It reflects a continuation of the phased program to provide cryptographically secure communications, including on-line security of fleet broadcast, tactical and point-to-point circuits.

Cryptologic Equipment—$8.2 Million. (P–1 line items 140–148).—This program provides equipment to enable the Navy to meet requirements in phase with Office of Secretary of Defense approved plans. It also provides for continued improvement in the Navy's support capability.

Communications and Electronic Equipment Financing

Chairman Ellender. According to my figures, of this total request of $456.3 million, $392.3 million is for items required for the 10 major categories we have discussed earlier, as follows: Antisubmarine warfare, $213 million; antisurface missile defense, $43.8 million; spares and repair parts, $42.7 million; fleet ballistic missile support, $21.1 million; aviation support, $33.3 million; and satellite communications, $38.4 million; leaving a balance of $64 million. Are these figures correct?

Admiral Minter. Those figures are correct, Mr. Chairman.

Naval Tactical Data System

Senator Young. As I recall, the $8.4 million requested in line 1 of the P–1 exhibit for the Navy tactical data system was included in your total for the anti-ship missile defense system. Am I correct about this?

Admiral Sonenshein. Yes, sir; that is correct.

Tactical Data System

Chairman Ellender. I wish you would provide for the record a detailed statement on the current status of the Navy tactical data system, its cost through fiscal year 1972, and exactly what you plan to do with the $8.4 million you are requesting for fiscal year 1973.

Admiral SONENSHEIN. By the end of fiscal year 1972 [deleted] ships and six shore establishments will have operational Navy tactical data systems (NTDS) installed. The shore establishments require NTDS systems for training and programing support. By the end of fiscal year 1973 [deleted] additional ships will also have operational systems.

The total cost of this system through fiscal year 1972 is: $227.5 million in SCN, $118.4 million in OPN and $103.9 million in R.D.T. & E., N. for a total of $449.8 million.

The $8.4 million requested in fiscal year 1973 will provide for the procurement of additional components to upgrade current installations, field changes for the data display equipments and modifications to existing computer components to meet tactical air control systems and tactical air defense systems requirements.

DLGN-38 TRAINING EQUIPMENT

Chairman ELLENDER. On line 23 of the P-1 exhibit, there is a request of $4.1 million for the procurement of training equipment associated with the new nuclear powered guided missile class. Please comment on the nature of, and the need for, this equipment.

Admiral SONENSHEIN. The DLGN 38 training equipment consists of computerized tactical data and peripheral equipments unique to the DLGN 38 such as computer, converters, switchboard and communication equipments. Current shore training facilities neither have the capability nor the types of equipments required to provide the essential maintenance and operator training in support of the type of ship.

DD-963 TRAINING EQUIPMENT

Chairman ELLENDER. Please comment on the request of $4.9 million for training equipment for the new DD-963 destroyers, and tell us why this procurement is necessary in view of the fact that these new destroyers will not come into the fleet for another 2 or 3 years.

Admiral SONENSHEIN. The $4.9 million will provide for combat data systems maintenance training, command and control team and task force training, and maintenance training for the new digital type sonar to be installed aboard the DD-963 class ships. The required date for start of training is July 1974 to meet the 1st ship completion date of October 1974. The procurement and installation lead time of 24 months requires procurement in fiscal year 1973 to satisfy the start of training date.

LHA TRAINING EQUIPMENT

Senator YOUNG. Comment on the nature of the equipment to be procured with the $4.8 million for LHA training equipment set out on line 24 of the P-1 exhibit, and tell us why it is necessary to provide funds for this purpose in fiscal year 1973.

Admiral SONENSHEIN. The equipment to be procured with the $4.8 million is integrated tactical amphibious warfare system equipment unique to the LHA. Plans for procurement of this equipment in fiscal year 1973 are based on a minimum procurement lead and installation time of 24 months plus training time.

CLASSIFIED PROJECT

Chairman ELLENDER. On line 52 of the P–1 exhibit, under the code name Badeye, I note a request of $1.2 million. Just what is involved in this request?

Admiral MINTER. Badeye is an acronym for a classified [deleted] program designed to [deleted].

BEACH JUMPER SUPPORT

Chairman ELLENDER. Comment on the request of $800,000 set out in line 58 for "beach jumper support."

Admiral MINTER. This money will be used to buy components for the first of eight [deleted] systems. The first system is scheduled for test at sea and in fleet exercises [deleted].

WARFARE ANALYSIS RESEARCH SYSTEM

Chairman ELLENDER. Line 71 of the P–1 exhibit sets out a request for $3.5 million for warfare analysis research system. I wish you would comment on the nature of this equipment and tell us if it is in any way associated with war gaming.

Admiral MINTER. The fiscal year 1973 warfare analysis and research system procurement consists of a display and control suite to replace obsolete electronic equipment. This suite, consisting of a large screen display, a set of control consoles, and the required simulation equipment, is designed to enable the Chief of Naval Operations, the Naval War College staff and students, and fleet commanders to more effectively consider and improve human decisionmaking capabilities as applied to naval operations in a variety of strategic and tactical situations. This is accomplished through the medium of human interactive war games conducted by the Naval War College, Newport, R.I.

SUPPORT OF FREE WORLD FORCES

Senator YOUNG. On line 72 of the P–1 exhibit, I note a request of $200,000 for the military assistance service funded program. Please comment on this request.

Admiral MINTER. Funds requested in this line item provide electronic equipments for the Republic of Vietnam Navy. These electronic equipments are required to satisfy communication functional requirements at Vietnam Navy installations, vessels, and plants. Various projects are developed by the Chief of Naval Operations (CNO) during the fiscal year that identify specific communication needs for the Vietnam forces. Funds requested herein will provide requisite communication equipment and support for these CNO projects.

REMOTE SENSORS

Chairman ELLENDER. Please comment on the types of equipment you expect to buy with the $2.5 million requested for remote sensors as set out in line 73 of the P–1 exhibit.

Captain KENNEDY. The Navy has requirements for equipments which will enable us to continue building a remote sensor capability which is responsive to Navy-peculiar needs, particularly in the areas of amphibious and air strike warfare. The funds requested are to in-

crease and support this capability through procurement of replacement sensors and related equipments which are expended from training packages provided to fleet units.

In addition, the funds will be used to procure equipments which will enable us to provide increased physical security of arms rooms, magazines, and other sensitive areas at selected Navy bases where a high rate of pilferage of small arms, particularly by dissident groups, has occurred. Physical security equipments are planned for updating the physical security system at Naval Station, Subic Bay, Philippine Islands, and for new installations at additional bases during fiscal year 1973.

The types of equipment include acoustic, seismic, electromagnetic, ultrasonic, and magnetic sensors, associated radio and alarm relay equipment, power supplies, and readout equipment.

LORAN–C Navigation System

Chairman Ellender. On line 87 of the P–1 exhibit, there is a request of $1.6 million for "precise time for LORAN–C." What is the nature of this request, and why are we continuing to provide equipment for the LORAN–C system when the new Omega system is coming into operation?

Captain Kennedy. This request is to enable us to provide the existing LORAN–C navigation system with the ability to disseminate precise time signals with a higher degree of accuracy.

We are continuing to provide equipment for this system because it is a precise navigational and timing system being used by the U.S. Navy for tactical operations. LORAN–C has a navigational accuracy of a few hundred feet as compared to Omega accuracy of one or 2 miles. The Omega system is a general purpose worldwide navigational system never intended for precise positioning or tactical operation, and it will not replace the LORAN–C system.

Naval Reserve Training

Senator Young. What is involved in the request of $2.1 million set out on line 88 of the P–1 exhibit for Naval Reserve training?

Captain Kennedy. This program provides modern electronic equipment for two groups of the Naval Reserve Forces. The Reserve security group units provide technical training for individuals and teams in communications security and other cryptologic operations. Six of these units have already been equipped; $1 million of the funds will be used to equip the next 14 units in the priority list. The Reserve inshore undersea warfare units provide surface and subsurface surveillance, detection and classification of targets for harbor defense. It is intended that $1.1 million will be used to equip 11 of these units with radar for surveillance and radios for communication with boats and aircraft.

Closed Circuit T.I. & E. System

Chairman Ellender. On line 97 of the P–1 exhibit, there is a request of $2.1 million for the procurement of 40 "Closed circuit T.I. & E. systems." Please describe these systems and comment on your need for the 40 for which you are requesting this $2.1 million.

Admiral MINTER. These systems will provide closed circuit television to 10 or more remote receivers throughout a ship. These systems will be capable of playing Armed Forces radio and television and Navy motion picture exchange film, video tapes and slides while at sea, plus receiving local commercial TV broadcasts while in port. The systems will include a minimal capability for making onboard TV presentations. These 40 systems will be an initial increment in providing an austere capability in a command and control role and a training, information and entertainment subsystem, on ships of DDG size or larger. The purpose of these systems is to keep Navy personnel current with "real world" happenings while in the isolation of the "ship-at-sea" environment and provide education and entertainment for morale purposes.

RADIAC

Chairman ELLENDER. Just what is involved in the request of $1.6 million set out in line 98 of the P–1 exhibit for Radiac?

Captain KENNEDY. The purpose of Radiac equipment is to detect and measure radiation from radioactive material and X-ray sources. These equipments are required for personnel dose control, hazard evaluation and damage assessment in daily operations and in warfare situations when a radiation environment is suspected or present. The request for $1.6 million will provide support to operational programs relating to nuclear power, medicine, nuclear weapons carriers, and radiography.

SHIPBOARD COMMUNICATIONS EQUIPMENT

Chairman ELLENDER. $5.8 million is requested in lines Nos. 101 through 109 for the procurement of shipboard communications equipment. Of this total, $1 million is for field changes. Just what is meant by "field changes"?

Captain KENNEDY. A field change is a modification or alteration to electronic equipment developed for the purpose of improving performance, operational characteristics, maintenance, reliability, or safety features of such equipment.

Senator YOUNG. The total of $5.8 million includes $4.4 million for "shipboard items less than $500,000." Give us several examples of the types of equipment you expect to procure with these funds.

Captain KENNEDY. Some examples of shipboard communications items procured with these funds are portable radios, teletypewriters, terminal equipment for copying multichannel broadcast, interface components for marrying communications equipment to secure voice devices, antennas, and multicouplers required to enable using multiple communications units with a single antenna.

OMEGA NAVIGATION SYSTEM

Chairman ELLENDER. On line 100 of the P–1 exhibit, there is a request for $7.2 million for the OMEGA navigation system. As I recall, about $3 million of this total was included in your discussion of the total for antisubmarine warfare programs. Am I correct about this?

Admiral MINTER. Yes, sir; this provides OMEGA receivers for submarines.

Senator YOUNG. How much of this $7.2 million is to give ships and submarines a capability to use the new OMEGA system, and how much is for the procurement of equipment for the OMEGA sending stations?

Admiral MINTER. $3 million will provide receivers for submarines and $4.2 million will provide shore station equipment.

Chairman ELLENDER. I wish you would provide for the record a detailed statement on the OMEGA system, its current operational status, and the funding for fiscal years 1971, 1972, and 1973 from all Navy appropriations.

Captain KENNEDY. The OMEGA system is in the implementation phase. Four interim stations which are currently operating will be replaced by permanent stations starting July 1972. In addition, four new stations should be operational by the end of calendar year 1974. The major electronic equipments for the eight shore stations have been procured and deliveries have commenced. Approximately 125 OMEGA receivers have been installed and are currently being utilized in U.S. Navy surface ships. Additionally, 377 surface ship receivers are under contract and will start delivering in March 1972.

The fiscal year 1973 request will provide submarine receivers, antenna and shelters (Trinidad) and services required for design and installation of the worldwide, all-weather, continuously operating VLF navigation system. The system when completed will provide position fixes for ships, submarines, and aircraft.

OMEGA funding information for fiscal years 1971, 1972, and 1973 from all appropriations will be provided for the record.

(The information follows:)

OMEGA FUNDING FROM ALL NAVY APPROPRIATIONS

[In millions of dollars]

	Fiscal year—		
	1971	1972	1973
Milcon	3.2		
OPN	9.3	4.6	7.2
O. & M., Navy	1.4	2.8	2.0
R.D.T. & E	.3		
PAMN	1.1	4.4	2.4

SHORE COMMUNICATIONS EQUIPMENT

Chairman ELLENDER. $9.5 million is requested for equipment to support naval shore communications requirements. These items are set out in lines number 110 through 122 of the P–1 exhibit. Of this total request, $4.9 million was included in your discussion of ASW systems. Isn't that correct?

Admiral MINTER. Yes, sir. P–1 line number 112 (ASW communications) provides for communications support to the ASW Tactical Support Center (TSC), primarily in the form of a communications interface between the airborne P–3C aircraft and the TSC.

AUTODIN SYSTEM

Senator YOUNG. What is involved in the request of $1 million for the AUTODIN system set out on line 115 of the P–1 exhibit?

Captain KENNEDY. The automatic digital information network (AUTODIN) is the general purpose switched digital network of the Defense Communications System and is designed to provide a highly reliable digital communications system. The requested funds of $1 million will procure equipments to backfit digital subscriber terminal equipments (DSTE's), an integral part of this system, which are to be installed at Navy stations in the continental U.S. subscribers and upgrade major Navy overseas communications complexes requiring a high speed capability.

TELECOM PROCESSOR TERM EQUIPMENT

Chairman ELLENDER. Please comment on the request of $1 million as set out on line 120 of the P–1 exhibit for "telecom processor term equipment."

Captain KENNEDY. The telecommunications processor terminal (TPT) is designed to satisfy the specialized automated communications requirements at major supply management control points. Through automation of the various functions currently processed in a data card oriented semi-automated or manual environment, the supply point will be better equipped to respond to fleet operational requirements. The requested funding of $1 million will provide TPT's at Naval Supply Center, Oakland, Ships Parts Control Center, Mechanicsburg, and the Aviation Supply Office, Philadelphia.

CRYPTOGRAPHIC AIDS AND DEVICES

Chairman ELLENDER. The request includes $10.7 million for the procurement of a wide variety of cryptographic aids and devices, as set out in lines number 129–139 of the P–1 exhibit. About $8.1 million of this total was included in your discussion of the major categories. As I understand, these items are to protect and make secure our own communications system. Am I correct about this?

ADMIRAL MINTER. That is correct. The cryptographic devices are designed to provide security to telecommunications by converting information to a form unintelligible to an unauthorized interceptor and by reconverting such information to its original form for authorized recipients.

CRYPTOLOGIC EQUIPMENT

Chairman ELLENDER. $8.2 million is requested for the procurement of several different types of cryptologic equipment, as set out in P–1 line items 140 through 148. I assume this equipment is for the support of the Department of Defense consolidated cryptologic program and is included in the total for the Department of Defense general intelligence program. Am I correct about this?

Admiral MINTER. That is substantially correct. Seven million and eight hundred thousand dollars is for the support of the Department of Defense consolidated cryptologic program and is included in the total for the Department of Defense consolidated defense intelligence program. The remaining $0.4 million is in support of and included in the consolidated telecommunications program.

BUDGET ACTIVITY 3—AVIATION SUPPORT EQUIPMENT

Chairman ELLENDER. The total requested for this appropriation includes $376.5 million for budget activity 3 entitled "Aviation Support Equipment". Pages 2 through 6 of the justifications will be included in the record at this point.

(The information follows:)

Budget activity 3—Aviation support equipment

[In thousands]

Fiscal year 1973 estimate	$376,500
Fiscal year 1972 estimate	389,500
Fiscal year 1971 actual	278,084

Purpose and Scope of Work

Budget Activity 3 finances the procurement of all air-delivered ordnance required for the Navy forces and Marine Air Wings, except guided missiles funded under the Procurement of Aircraft and Missiles, Navy (PAMN) appropriation. It also includes air-launched, anti-submarine warfare (ASW) weapons and general support equipment not directly associated with aircraft and missile systems.

Justification of Funds

Air launched ordnance and support equipment—ASW (includes P–1 line items 1–4)

[In thousands]

Fiscal year 1973 estimate	$80,800
Fiscal year 1972 estimate	91,500
Fiscal year 1971 actual	49,257

Sonobuoys—$64.7 Million (P–1 Line Item 1).—Sonobuoys are expendable electronic listening devices used by carrier-based and land-based ASW fixed wing aircraft to detect, classify and localize submarines. They are dropped in various patterns from patrolling aircraft and detect the presence of submarines through both passive and active techniques. Data that provide information relative to target classification and location are then transmitted electronically from the sonobuoy to the aircraft. The quick reaction time and wide coverage resulting from inherent aircraft mobility, coupled with the sensitivity and accuracy of sonobuoy devices, creates an extremely effective means of detecting and localizing submarines.

The proposed FY 1973 procurement has been computed considering the number of ASW Carrier Air Groups and shore-based ASW patrol squadrons to be supported, actual and planned peacetime usage for these forces, and the necessary training allowance requirements. Six types of sonobuoys are planned for procurement in FY 1973.

ASW Tactical Support System (ASTACS)—$14.6 Million (P–1 Line Item 3).—The ASW Tactical Support System is a shore based installation that provides fast time acoustic analysis, intelligence data, track reconstruction, data correlation and the capability to automate and process integrated ASW sensor data in support of deployed ASW patrol aircraft (P–3C). In addition, it provides the primary interface with the new P–3C weapon system. The FY 1973 procurement will provide [deleted] shore based ASTACS, which will be located at [deleted]. The systems will be built into interlocking modules to provide highly flexible, dedicated and if necessary, mobile sites capable of rapid redeployment.

Naval Reserve ASW Equipment—$1.5 Million (P–1 Line Item 4).—These resources will provide sufficient equipment for the training of 11 of 22 Naval Reserve Inshore Undersea Warfare (NRIUW) Divisions. The procurement of this equipment will enable NRIUW Divisions to be responsive to their assigned mission and thus enhance their ability to detect, classify and localize submarines.

Air launched ordnance and support equipment (includes P–1 line items 5–29)

[In thousands]

Fiscal year 1973 estimate	$223,100
Fiscal year 1972 estimate	227,420
Fiscal year 1971 actual	148,730

The FY 1973 budget request of $223.1 million will procure [deleted] of air-launched ordnance. This tonnage will provide for combat and training consumption and will support the war reserve (mobilization) requirements. While the inventory position of some individual items will be improved both in terms of quality and quantity, the overall tonnage in inventory will remain about the same as the planned level at the end of FY 1972.

Walleye Conversion Program—$12.3 Million (P–1 Line Item 5).—The WALLEYE conversion program requires $12.3 million in FY 1973. This funding will cover the cost of modification, including hardware, of [deleted] WALLEYE I weapons to the WALLEYE II configuration. [deleted] of these WALLEYE II's will be provided with a data link and larger wings and fins, which will give [deleted] improved stand-off range. This limited quantity of data-link extended range WALLEYE II's will be used for Naval technical and operational evaluations.

MK–80 Series Bombs—$69.3 Million (P–1 Line Items 6–8).—These bombs are general purpose bombs used for most bombing situations against a variety of targets, and therefore heavy usage is expected. The funds requested for the MK–82 bomb ($60.8 million) include the funding required for [detelted] Laser Guided Bomb Kits being procured [deleted]. The MK–83 G.P. Bomb procurement requires $6.1 million, while $2.4 million is needed for resumption of procurement of the MK–84 G.P. Bomb.

ROCKEYE and Firebomb MK–77—$36.8 Million (P–1 Line Item 9–11).—ROCKEYE, the Navy's standard cluster bomb used against medium to heavy material targets, is funded at $32.1 million. Also budgeted is $4.7 million for initiators for the MK–77 firebomb to replace unsafe fuses in the MK–77 inventory.

Fuel Air Explosive Bomb—$11.9 million (P–1 Line Item 12).—These funds are for consumption requirements and moderate inventory build-up of the CBU 55/B Fuel Air Explosive Bomb, a relatively new weapon that has been very successfully introduced in Southeast Asia and is used with the AX4, OV–10, and UH–1E aircraft.

Air Launched Rockets—$55.4 million (P–1 Line Items 17 and 18).—This request will provide for increased procurement of the ZUNI Rocket ($35.0 million) and resumption of procurement of the 2.75'' Rocket, both scarfed and unscarfed ($20.4 million). The 2.75'' unscarfed rocket buy is primarily for training consumption of Navy and Marine attack aircraft, while the buy of scarfed rockets will offset helicopter combat and training consumption and slightly increase low inventories.

Aircraft Gun Ammunition—$11.6 million (P–1 Line Items 19–22).—The procurement of 20 MM Gun Ammunition will require $3.6 million for service and $6.3 million for practice ammunition, respectively. The 20 MM Gun Ammunition is used with the MK–11, MK–12, and MK–61 Guns installed in most of the Navy's fixed wing aircraft. The remaining $1.7 million is for 30 MM Gun Ammunition, both service and practice, used with the Aden Gun installed in the AV–8A HARRIER being procured for the Marine Corps.

Miscellaneous Ordnance and Support—$25.8 Million (P–1 Line Items 13, 14, 16, and 23–29).—First destination transportation is funded at $6.5 million for all items under Budget Activity 3 of this appropriation. Also included under this category is $6.4 million for procurement of various inert training bombs, $7.7 million for the cartridge and rocket actuated devices used as a source of power to eject personnel and bombs from high speed aircraft, $1.2 million for marine location markers primarily used as visual aids in location of sonobuoys in anti-submarine operations and $1.0 million for the ADR Chaff Rocket used for training in the field of surface-to-air missile countermeasures. Other programs funded at $3.0 million include miscellaneous pyrotechnics, Defense Nuclear Agency material, and miscellaneous items of air-launched ordnance and related support.

Other support equipment (includes P–1 line items 30–64

[In thousands]

Fiscal year 1973 estimate	$72,600
Fiscal year 1972 estimate	70,580
Fiscal year 1971 actual	80,097

Weapons Ranges Support Equipment—$9.5 million (P–1 Line Item 30).—This budget item includes $4.2 million for the Barking Sands Underwater Range in the Pacific and $5.3 million for the Atlantic Fleet Weapons Range (AFWR). The procurement plan for the Pacific Range provides further improvements of the underwater instrumentation to meet critical fleet tactical requirements. Modification to and expansion of instrumentation for the shallow water areas of the range will provide a capability for testing the MK–48 Torpedo weapons system and provide additional maneuvering room, operational flexibility and extended tracking range coverage for the SUBROC and ASROC Weapon Systems. Funds requested for the Atlantic Fleet Weapons Range provide for the continuation of an improvement program designed to enable the Atlantic Range to provide the Fleet with surveillance, control and data-gathering equipment to accommodate expanded training requirements. The principal item in this request is $4.0 million for the modification of the Electronic Warfare Training Range to provide a more realistic electromagnetic environment for fleet training exercises.

Aircraft Launching and Retrieving Equipment—$14.4 Million (P–1 Line Items 34–41).—Aircraft launching and recovery aids for the Navy's aircraft carriers and the Marine Corps Short Airfield for Tactical Support (SATS) systems are funded under this program. The FY 1973 program includes $4.0 million for SATS support as part of a vigorous improvement program to correct deficiencies and to modernize the SATS equipment. The remaining $10.4 million is for launching and retrieving equipment which includes $3.3 million for procurement of jet blast deflector equipment and portable fresnel lens optical landing systems, $6.1 million to correct problems encountered in the operation and maintenance of existing equipment and $1.0 million to provide Naval Air Stations with high capacity, high cycle, quick retracting arresting gear. These funds are necessary to meet expanding responsibilities in support of helicopter operations on non-aviation ships, to meet demands for increased launching and recovery equipment reliabilities and to satisfy the need for efficient, centralized support of shorebased test facilities.

Aircraft Rearming Equipment—$2.5 Million (P–1 Line Item 42).—This estimate provides $1.0 million for HLU–196 aircraft loading systems for A–4, A–6, A–7 and F–4 aircraft developed in connection with the Improved Rearming Rates System (IRRS) which will permit rapid weapon loading of strike aircraft with a minimum number of personnel on the flight deck. The remaining $1.5 million provides for additional weapons cradles and procurement of wing and fin containers for SPARROW and SIDEWINDER missiles for attack carriers which are configured or will be configured for the IRRS.

Meteorological Equipment—$6.1 Million (P–1 Line Items 45–51).—Meteorological equipment to be procured in FY 1973 for the Navy Weather Service includes automatic weather stations for gathering data from isolated locations where the operation of manned observation stations or ships is not economically feasible, satellite data interpretation equipment to format, digitize, interpret and display meteorological satellite data when this raw data has been received and processed, equipment for the high-speed transmission of weather data, support for a classified meteorological data project, miscellaneous equipment to monitor and report weather conditions, and sounding rockets to gather high altitude meteorological data.

Photographic Equipment—$4.2 Million (P–1 Line Item 52).—The photographic equipment program includes the procurement of ground still and motion picture cameras, processors and the production of training films. The FY 1973 budget includes $1.9 million for locally procured equipment to support Navy photographic laboratories, $1.4 million for procurement of training films, and $.9 million for centralized procurement of major laboratory equipment such as processors and printers.

Reconnaissance and Electronic Warfare Support—$8.8 Million (P–1 Line Items 57–58).—This program includes $2.0 million for procurement of specialized intelligence collection, readout and analytical equipment for air, surface and subsurface forces. The remaining $6.8 million is in support of the Naval Intelligence Processing System (NIPS) which is an integrated tactical shipboard intelligence system to provide the operational commander with an organic capability to rapidly process, analyze, update and disseminate tactical intelligence throughout the fleet and to higher commands. The NIPS includes shipboard tactical intelligence centers for attack carriers, amphibious comamnd ships, and the numbered fleet commanders' flagships.

Airborne Mine Countermeasures Equipment—$9.4 Million (P–1 Line Item 61).—These funds will provide for the procurement of mechanical, acoustical, and magnetic minesweeping equipment towed by the RH–53 and other suitably configured helicopters. The introduction of an airborne minesweeping capability considerably enhances the effectiveness of the mine forces. The much higher unit efficiency of mine countermeasure helicopters is reducing the need for more costly minesweeping ships.

Other Equipment—$17.7 Million (P–1 Line Items 32, 33, 54–56, 60, 62–64).—The FY 1973 request includes $.3 million for stock surveillance equipment (in the Items of Less Than $500,000 Each) used to monitor the quality and reliability of air-launched weapon inventories, and $.4 million for survival radios worn on personnel during flight to improve search and rescue operations in locating and recovering downed aircrewmen. Bomb Scoring/Drone Control equipment, budgeted at $1.0 million, finances procurement of new integrated target control equipment to control drones with greater reliability and capability than the obsolete AN/MSQ–51 presently used. Miscellaneous survival equipment procurement ($1.3 million) includes equipment for the personal safety and protection of aircrewmen against the hazards encountered in the aircraft operating environment and emergency and survival situations. The program for replacement and restoration of government-owned production equipment and tools, and capital maintenance of real property, requires $2.0 million. Air-launched chaff and infra-red flares to be used by Navy tactical aircraft to provide electronic countermeasures (ECM) self-protection are budgeted at $1.3 million. An additional $2.3 million is required for automatic data processing (ADP) equipment which will provide Marine Air Groups with a data processing capability to support supply and financial functions and the Maintenance Material Management (3M) system. Procurement of LAMPS (Light Airborne Multi-Purpose Systems) equipment ($2.6 million) will provide the DLG/1052 destroyers with long range detection, redetection, and detailed analysis of underwater targets from both active and passive sonobuoys. The estimate of $6.5 million for spares and replenishment materials includes initial spares for end items budgeted in this activity ($5.1 million) and replenishment spares for launching and retrieving equipment ($1.4 million).

Aviation Support Equipment Financing

Chairman Ellender. According to the figures I have, this total request of $376.5 million was included in your discussion of the 10 major categories, as follows: Antisubmarine warfare, $87.6 million; expendable ordnance, $224.4 million; spares and repair parts, $6.5 million; and aviation support, $58 million. Are my figures correct?

Admiral Clancy. Yes, sir.

ASW Tactical Support Program

Senator Young. On line 3 of P–1 exhibit there is a request of $14.6 million for the procurement of equipment to support the ASW tactical support system. What is the function of this system? How is it related to the P–3C Orion submarine patrol aircraft?

Admiral Armstrong. The function of the air ASW Tactical Support Center is to provide premission briefing for the flight crew, in-flight—on station—information exchange and post mission analysis

and evaluation of the tactical and sensor data acquired during the flight. [Deleted.] The P–3C with its on-board computer integrated avionics system gathers data in a format and with a volume never before experienced in the fleet. [Deleted.] The Tactical Support Center processes [deleted] by the operational commander to effectively dispatch and coordinate the aircraft on station. The Tactical Support Center also processes the acoustic sensor information [deleted].

Shore Based Facilities

Chairman Ellender. How many shore based facilities are included in this system, how many are operational to date, where are they located, and does your request for fiscal year 1973 include funds for any new shore based facilities?

Admiral Armstrong. There are [deleted] shore based tactical support centers in the air ASW tactical support system. There are [deleted] operational to date [deleted]. There are [deleted] systems being procured with fiscal year 1972 funding with installation commencing in October 1972. They are [deleted]. The fiscal year 1973 funding request of $14.6 million is to provide the next [deleted] installations. They are [deleted]. The fiscal year 1974 funding projection includes [deleted] systems which will complete the shore based program. These sites will be [deleted].

Weapons Ranges Support Equipment

Chairman Ellender. On line 30 of the P–1 exhibit, there is a request of $9.5 million for "weapons ranges support equipment." I note that, of this total, $4.2 million is for the procurement of equipment to support the Barking Sands Underwater Range in the Pacific, and $5.3 million is for the support of the Atlantic Fleet Weapons Range. Please describe each of these facilities and give their locations and their basic missions.

Admiral Clancy. The underwater range is a component of the Pacific Missile Range facility which is located at Barking Sands, Kauai, Hawaii. The underwater range portion is located in a 5-by-10-mile area approximately 10 miles offshore in water depths of 400 to 1,000 fathoms. The 37 bottom-mounted tracking hydrophones are cabled to shore for data processing, analysis and display.

The underwater range was designed and developed to provide the Navy an area in which to conduct combined air, surface, and subsurface antisubmarine warfare operations. The range has facilities to track and record the positions of surface ships, submarines, weapons, and aircraft simultaneously to enable the Navy antisubmarine warfare forces to develop and improve submarine detection and destruction tactics, to check the performance of weapons and torpedoes, and to determine operational readiness. Essentially, the range performs somewhat as an umpire and permits relatively free-play fleet operations with postoperational review and analysis. Typical fleet operations on the range include submarines, ships, and antisubmarine warfare aircraft attacking submersibles utilizing sophisticated antisubmarine warfare weapons.

The Atlantic Fleet Weapons Range is located at Roosevelt Roads, P.R., and extends 600 miles into the North Atlantic Ocean and east Caribbean Sea. It is an integrated complex with facilities and instrumentation required to provide the fleet with a realistic training environment in the air, on and under the sea. The mission of the range is to maintain and operate instrumentation, provide targets and range services for the entire complex in support of fleet training and operational procedures. The range complex is used by the fleet as well as navies from other NATO countries.

Senator YOUNG. Is the purpose of this new equipment to give these ranges a capability that they do not have, and if so, please comment on this new capability.

Admiral CLANCY. Yes, sir. The increase at the Pacific Missile Range is for two major items; range expansion and underwater range security/surveillance. The range will be expanded from a 5-by-10 to 10-by-10-mile area providing a longer range tracking capability. [Deleted.)

The purpose of this new equipment at the Atlantic Fleet Weapons Range is to provide improved electronic warfare training by means of ship threat simulators, ship radar target generators, and communication jammers. Range extension of command and control communications will be provided by the addition of airborne UHF communications relays.

METEOROLOGICAL EQUIPMENT

Chairman ELLENDER. You are requesting $6.1 million for the procurement of various types of meteorological equipment, as set out in lines number 45 through 51 of the P–1 exhibit. Comment generally on the nature of the equipment to be procured with these funds.

Admiral CLANCY. Funds requested in these line items are for the procurement of equipment required to gather weather data and to rapidly disseminate weather information to Navy and Marine Corps units. The Naval Weather Service Command, as the operating weather arm of the Navy, provides specialized weather services peculiar to the Navy's needs, that are not provided by the National Weather Service of the National Oceanic and Atmospheric Administration (NOAA).

Various types of meteorological equipment, such as radar, satellite recorders, airborne sensors, automatic weather stations, wave height measuring systems, rocket systems and tactical weather stations are being requested to provide weather information in support of naval operations. These operations cover large expanses of remote ocean areas where data of this nature are not otherwise available. The equipment is specifically used to detect, measure and record meteorological parameters such as temperature, pressure, wind speed and direction, relative humidity, cloud height and visibility, areas of precipitation by use of radar and cloud cover pictures from orbiting satellites.

The information derived from this equipment is used in weather forecasting, planning flight operations and tactical military operations. Meteorological observations must be accurate and timely in order to keep pace with the high speed tempo of modern naval operations and to insure the most effective use of weapons systems.

Chairman ELLENDER. On page 5 of the justifications, I note the following statement: "Support for a classified meteorological data project." Please see that the committee is provided with the details on this classified project.

Admiral CLANCY. I will be happy to provide the details.

[Classified information was furnished to the committee.]

BUDGET ACTIVITY—4 ORDNANCE SUPPORT EQUIPMENT

Chairman ELLENDER. The total requested for "Other procurement, Navy" includes $560,600,000 for the budget activity entitled "Ordnance support equipment." Pages 2 through 11 of the justification will be included in the record at this point.

(The information follows:)

Budget activity 4—Ordnance support equipment

[In thousands]

Fiscal year 1973 estimate	$560,600
Fiscal year 1972 estimate	441,482
Fiscal year 1971 actual	431,645

Purpose and Scope of Work

Budget Activity 4 funds a broad spectrum of Naval items ranging from expendable to nonexpendable ordnance and includes various support for this ordnance. This Budget Activity finances all expendable ordnance except guided missiles and air-launched munitions. Included among these expendable ordnance items are ship gun ammunition, torpedoes, mines and small arms ammunition. This Budget Activity also provides funding for such major nonexpendable ordnance as equipment for the improvement and retrofit of all surface gun and surface missile systems. In addition, Budget Activity 4 encompasses the acquisition of spare and repair parts for the above items, the procurement of training and testing devices, and the acquisition of such logistics support material as production facilities and equipment.

Justification of Funds

[In thousands]

Fiscal year 1973 estimate	$219,300
Fiscal year 1972 estimate	159,371
Fiscal year 1971 actual	153,918

Ship launched ordnance and related equipment (includes P–1 line items 1–42)

Ship Gun Ammunition $49.5 million (P–1 Line Items 1–4).—The total of $49.5 million for ship gun ammunition is comprised of $10.5 million for three-inch ammunition and $39.0 million for five-inch ammunition. The three-inch ammunition is for use primarily against air targets, but is also available for use against surface and shore targets as is the five-inch ammunition. The total funding amount is required to procure ammunition components to support: [Deleted.]

Other Expendables $12.5 million (P–1 Line Items, 7, 8, 22 and 23).—The total of $12.5 million for expendables other than ship gun ammunition is comprised of $4.1 million for small arms ammunition (small cannon, mortar, and grenade ammunition), $1.1 million for pyrotechnic and demolition material (this includes the installation of [deleted] systems in specific type ships [deleted] $6.1 million for Fleet Mine Support and $1.2 million for Swimmer Weapon Systems.

The Close-In-Weapon System (CIWS) $23.2 million. (P–1 Line Item 41).—This is the VULCAN/PHALANX system, the best alternative in providing individual ships a defense against close-in threats. CIWS is a unitized gun weapon system, incorporating a search and track radar, a fire control system, 20MM gatling gun and special 20MM ammunition. These funds are required for the initial procurement in FY 1973 of nine (9) CIWS units and for start-up costs for the total pilot production by of [deleted] units. The remaining [deleted] CIWS units of the pilot production will be procured in FY 1974 and FY 1975. Installation is scheduled to begin early in [deleted].

5''/54 Gun Mount Conversion Program $16.8 million. (P–1 Line Item 13).—This program provides for the continued procurement and installation of new state-of-the-art components for the conversion of 5''/54 gun mounts from MK 42 MOD 7 or 8 to MK 42 MOD 10. The new components will result in simpler operation, higher reliability, and higher maintainability.

All Other Surface Gun Systems Support $10.2 million. (P–1 Line Items 12, and 14–17).—Of this total, $.8 million is devoted to gun mount components (receiver regulators, ammunition hoist drives, etc.), $.4 million to Surface Gun Systems training equipment and instructor services, $2.6 million to Surface Gun Systems Fire Control Equipment (new, more accurate, and more maintainable scanners, data translators/processors, and computers to replace equipment of early 1940's vintage), $4.6 million to Surface Gun Systems ordnance alterations and material (modification and improvements to reliability, maintainability, compatibility, and safety only for those ships that will be in the Active Fleet well into the 1980's), and $1.8 million to fire control switchboards ordnance alterations and material (increased interconnection capability and increased system flexibility).

Improved Point Defense (NATO SEASPARROW) $36.4 million. (P–1 Line Item 32).—This system is a second generation Point Defense Missile System succeeding the Basic Point Defense Surface Missile System and is being developed under the NATO SEASPARROW Program which incorporates financial participation from certain NATO countries. The U.S. Navy is committed by international agreement to procure a total of [deleted] NATO SEASPARROW Systems, [deleted] of which will be trainers, during fiscal years 1973 and 1974. The procurement and installation of this system will provide a short-range, all-weather, rapid-reaction, self-defense, surface-to-air missile system to counter the projected air and missile threat to Naval ships in the mid to late 1970's. It is suitable for installation, including retrofit, in nearly all classes of U.S. Naval ships, and will complement other larger, more sophisticated, costlier and more complex area-defense AAW Missile Systems. The $36.4 million will procure 14 systems.

Surface Missile Systems Ordnance Alterations $34.7 million. (P–1 Line Item 27).—The funds requested for ordnance alterations in these important Surface Missile Systems are vital since the Navy will depend so heavily upon the operational effectiveness of the [deleted] TERRIER, TARTAR and TALOS ships for area defense and offensive missions until well into the [deleted]. These funds will be employed for only those improvements which will offer the highest future payoffs. The major portion of the program is devoted to better TERRIER computer and radar equipments which are designed to provide improved defensive capability and more rapid reaction against [deleted]. The balance of the $34.7 million funding amount pertains to improvements in TERRIER, TARTAR and TALOS maintainability and safety.

Interim Surface-To-Surface Missile System $7.4 million. (P–1 Item 28).—This item provides for the procurement of modifications to shipboard weapon systems to equip selected ships with Standard Missile Surface-to-Surface capability. This is an expansion of the interim Surface-to-Surface Missile Program started in FY 1971 and is required to counter the Soviet Surface to Surface Missile threat until HARPOON is available in sufficient quantities in the late 1970s.

All Other Surface Missile Systems Support $11.4 million. (P–1 Line Items 25, 26, 29 and 33).—The $11.4 million total is comprised of $3.0 million for UHF telemetry equipment, $4.5 million for operation and maintenance training, $3.4 million for the Ships Anti-Missile Integrated Defense (SAMID) Program, and $.5 million for the Airborne Electronic Countermeasures/Electronic Counter-Countermeasures (ECM/ECCM) Program.

Shipboard telemetary equipment will be used to shift telemetry bands from VHF to UHF in accordance with the international agreement on tele-communications and to provide TERRIER, TARTAR and Basic Point Defense system ships with better capabilities for the evaluation of combat readiness. Training equipment provides for material, services and equipment necessary for the training of Naval personnel in the maintenance and operation of TERRIER, TARTAR, TALOS, Basic and Improved Point Defense Systems and UHF Telemetry equipment. SAMID program provides ASMD Near Term packages for [deleted] Navy Ships; [deleted.] The funds for the Airborne ECM/ECCM Program will be employed for the procurement of new, and the modification of existing, electronic equipments which will provide for the continued training of radar personnel in current electronic warfare techniques.

Miscellaneous Support Items $17.2 million. (P–1 Line Items 6, 9, 10, 18, 19, 24, 30, 34, 38–40 and 42).—Included among these items are the Anti-Ship Rocket Decoy System ($2.4 million) which employs [deleted] military assistance ($3.0 million) to South Vietnam in support of the Vietnamization program and material ($2.2 million) which will be provided to nuclear weapons activities in support of testing and training. Continued emphasis ($1.0 million) is placed on small arms standardization and modernization consisting of product improvements across the entire spectrum of small craft and auxiliary ship armament or increased safety, reliability and maintainability. Tools and equipment for the Navy Explosive Ordnance Disposal Teams who render safe and dispose of all known types of extraneous explosive ordnance are funded at $2.5 million. Other costs in the miscellaneous category are $.7 million for gun mounts acquired for the Coast Guard to ensure that they are properly armed during an emergency, $1.9 million for Unmanned Seaborne Targets acquired because of a need to train against the threat of high speed missile boats, $1.0 million for the cost of first destination transportation, $1.4 million for the acquisition of MK 22 MOD 0 Machine Guns which will replace early 1940's vintage machine guns used on small, auxiliary and amphibious vessels and $1.1 million for other weapons costing less than $500,000.

Ship launched ordnance and related equipment—ASW (includes P–1 line items 43–57

[In thousands]

Fiscal year 1973 estimate	$194,200
Fiscal year 1972 estimate	188,776
Fiscal year 1971 actual	170,530

Torpedo MK–48—$156.5 Million (P–1 line Item 45).—The MK–48 Torpedo possesses highly improved performance characteristics and has been developed to ultimately replace the less capable MK–37 Torpedo for the ASW role and the MK–14 and MK–16 Torpedoes in the anti-ship role thereby reducing to one the type of conventional (non-nuclear) torpedo which must be logistically supported. Funds being requested in FY 1973 are for the procurement of [deleted] MK–48 Torpedoes as well as associated support items. At the end of the FY 1973 delivery period an estimated [deleted] torpedoes will be on hand representing [deleted] of the stated inventory objective of [deleted].

Other Support Items—$16.7 Million (P–1 Line Items 43, 44, 46, and 52–57).—Funds requested in FY 1973 in the amount of $.6 million for ASROC are required to support the existing ASROC inventory. Torpedo Support ($9.9 million) funds the replacement of expended and overage components of existing inventories of torpedoes consumed in fleet exercise firings and various test programs. Torpedo Tube Support funded at $3.5 million includes the Torpedo Tube System components and test equipment which are required for in-service equipments. BARSTUR Support, which provides for procurement of exercise equipment and pingers in support of fleet firings at the Barking Sands Tactical Underwater Range, is funded at $1.0 in FY 1973. Items Less Than $500,000 Each Budgeted at $1.7 million includes miscellaneous small procurement such as surveillance components, minor fire control items and weapons test equipment.

Mobile Targets—$11.0 Million (P–1 Line Items 48 and 49).—Funding in the amount of $3.0 million in FY 1973 is required to refurbish MK–27 Mobile Targets procured in prior years. The MK–30 Mobile Target test vehicles will provide air, surface, and submarine ASW units with a means to conduct realistic ASW firings on ranges and will be compatible with all present day sonars and torpedoes. Funding of $8.0 million continues procurement of the MK–30 Improved Targets which will allow all fleet torpedoes (including the MK–48) and sonars to be fully exercised at the higher speeds and deeper depths required.

MK–48 Fire Control and Launcher Equipment—$2.5 Million (P–1 Line Item 50).—This item supports the procurement of dual-purpose ORDALT kits, ballistic and design changes, launcher expendables, management of installation of fire control equipment, and engineering technical services during fire control installations.

ORDALT Material—$7.5 Million (Includes P–1 Line Items 47 and 51).—Torpedo ORDALTS provide modifications and improvements to torpedoes in the fleet. ORDALTS planned for procurement at $4.5 million in FY 1973 are re-

quired as a result of evaluation tests and fleet use of torpedoes and associated equipment. The $3.0 million for ORDALT Material (ASW Weapon System) is required to provide modifications and improvements to in-service fleet ASW Fire Control Equipments on surface ships and submarines.

Other support equipment (P–1 line items 58 through 67)

[In thousands]

Fiscal year 1973 estimate	$80,500
Fiscal year 1972 estimate	66,535
Fiscal year 1971 actual	72,704

Approximately 80% of the funds requested for this sub-activity will be used for procurement of spares and repair parts in support of ordnance equipment. The balance of the request is associated with support items such as production equipment, calibration equipment and training aids and devices.

Spares and Repair Parts $65.1 million (P–1 Line Item 67).—An adequate supply of spares and repair parts is essential if the Fleet is to remain in a constant state of readiness. The items procured under this line item are the "horseshoe nails" that keep multi-million dollar ordnance systems operative. Approximately 60% of the funds requested will be used for procurement of initial spares and repair parts to support newly introduced weapons systems such as the MK–48 Torpedo and the Improved Point Defense System. The balance of the request is related to replenishment support, i.e. the replacement of material consumed so that required inventory levels will be maintained.

Production Facilities and Equipment $6.4 million (P–1 Line Item 61).—Two types of industrial facilities are supported in this line item. They are Government-owned, Contractor-operated plants such as the Naval Industrial Reserve Ordnance Plant Minneapolis Division of the FMC Corporation, and the Government-owned, Government-operated plants such as the Naval Ordnance Station, Indian Head, Maryland. The requirement for funds to support these activities is divided into three general categories. These are: Replacement and Restoration of Machine Tools and Other Related Equipment ($3.7 million) Capital Maintenance, Emergency Repairs and Fire Protection Improvements for Government-owned Contractor-operated plants ($1.7 million) and New Production Manufacturing and Testing Support Facilities, primarily for Government-owned Government-operated plants ($1.0 million).

Training Aids and Devices $3.7 million (P–1 Line Items 58 and 60).—Training Aids and Devices are required to ensure the availability of personnel in the fleet who are qualified to operate, maintain, and repair ordnance equipment. These funds are required for Surface Missile Systems Training Aids and simulators and for aids and devices used by instructors to demonstrate principles and relationships of nuclear weapons components, to provide effective training regarding electrical and electronic circuitry inherent in complex fire control systems, to illustrate construction and operational features of torpedoes and mines, and to teach safe and efficient techniques for general, less specialized, tasks such as ammunition handling.

Miscellaneous Support Equipment $5.3 million (P–1 Line Items 59 and 62–66).—In this category, $.9 million is devoted to the continued installations of SMS Training Equipment modifications, $1.6 million to the acquisition of new calibration equipment, and $2.2 million to the acquisition of new stock surveillance equipment. In reference to the first item, these alteration installations will continue to improve personnel proficiency in the operation and maintenance of Surface Missile Systems. In regard to the latter two items, the calibration devices will assure the uniformity and efficiency of the surveillance devices which, through test and evaluation, will ensure the safety, reliability and readiness of both developing and operational ordnance systems. The $5.3 million total also includes $.2 million for weapons packaging, handling, and underway transfer equipment and $.4 million for the initial outfitting of Naval Reserve Inshore Undersea Warfare Divisions.

FBM support equipment (includes P–1 line item 68–78)

[In thousands]

Fiscal year 1973 estimate	$66,600
Fiscal year 1972 estimate	26,800
Fiscal year 1971 actual	34,493

FBM Support Equipment includes support of the ULMS program for the first time in FY 1973. Justification of funding by P–1 line follows. More detailed justification showing the relationship of the POLARIS/POSEIDON line items to overall Fleet Ballistic Missile Program objectives is provided in the Strategic Systems Project Office Program Budget.

Initial Training $1.0 million (P–1 line item 68).—This P–1 line provides for procurement of equipments for modification of the POLARIS initial training facility at the Naval Guided Missile School, Dam Neck, to support POSEIDON training requirements.

Refresher Training $19.6 million (P–1 line item 69).—This line provides for procurement of equipment required for the three FBM refresher training facilities. Refresher maintenance and operational training for crews not on patrol is conducted at New London, Charleston, and Pearl Harbor. Refresher training provides SSBN crews with the opportunity to drill and learn the latest developments in operation, maintenance and casualty techniques. FY 1973 funding provides primarily for equipment procurements for the Charleston navigational operational trainer, refresher maintenance laboratories and weapons control subsystem trainer to meet the ready-for-training date of September 1974.

Training Hardware Recurring Costs $1.2 million (P–1 line item 70).—This line provides for replacement of ancillary equipment, special test equipment and tools, replenishment of non-stock repair parts lost through attrition and procurement of navigation problem tapes for four FBM training facilities (Naval Guided Missile School, Dam Neck; FBM Submarine Training School, New London; FBM Submarine Training Center, Charleston; and FBM Submarine Training Facility, Pearl Harbor). This line also funds alterations to training-unique (non-tactical hardware to maintain compatibility with tactical hardware as design changes are required by operating experience.

598 Class Overhaul $0.1 million (P–1 line item 71).—This line supports procurement of weapon system associated equipments required for replacement or refurbishment of worn out equipment and procurement of new or modified hardware which will be installed during regularly scheduled overhauls of the 598-class SSBNs.

608 Class Overhaul $1.4 million (P–1 line item 72).—This line supports procurement of weapon system associated equipments required for replacement or refurbishment of worn out equipment and procurement of new or modified hardware which will be installed during regularly scheduled overhauls of the 608-class SSBNs.

Second overhaul cycle for the 609 Class commences [deleted] and will complete [deleted]. During this series of overhauls alteration kits for fire control and MTRE must be procured to incorporate A–3 capability into the existing A–2 configuration.

Test Instrumentation Equipment $0.8 million (P–1 line item 73).—This line provides for procurement of instrumentation for the weapon system test and performance evaluation programs. This equipment records and processes data for the purpose of evaluating weapon system performance factors during the Ships Installation and Test Program, Demonstration and Shakedown Operation, Weapon System Readiness Test, and Operational Tests/Follow-on Operational Tests, including both shipboard weapon system interface and in-flight missile performance factors.

Alterations Equipment $11.4 million (P–1 line item 74).—This line provides for the procurement of tactical alterations to non-flying tactical hardware. The POLARIS alteration program provides for procurements of repair parts alterations for piece parts that are unavailable from present stocks and are no longer in production. The POSEIDON alteration program is directed toward application of continuing technological progress resulting from research and development effort and analysis of experience factors to the development of design modifications that will assist in accomplishing the following objectives: elimination of personnel safety hazards; correction of design deficiencies to achieve performance objectives; enhancement of system effectiveness by improving equipment operability; and achievement of logistic economies, increased reliability and lower net production, maintenance and training costs.

Maintenance and Support Equipment $3.6 million (P–1 line item 75).—This line provides for procurement of equipment used for maintenance, calibration, test or handling aboard deployed SSBNs and tenders and at shore installations and for principal stock items.

Test and Training Expendables $3.0 million (P–1 line item 76).—This line provides for replacement or refurbishment of launching subsystem hardware utilized by deployed SSBN crews during test shots. The FY 1973 budget includes funds for procurement of material used in launching missiles and water slugs. Water slug launches provide test and checkout of the individual launch tubes and the launcher subsystem under conditions similar to actual missile launch sequence to provide training for SSBN crews and to test FBM system readiness without actually test firing missiles. Actual missile launch testing is conducted during Demonstration and Shakedown Operation (DASO) testing following overhaul. Items expended during test firings include gas generator reloads, casting powder, EBW squibs, conax valves, launch tube closures, diaphragms, water slugs, foam wafers and inflatable seals.

Navigation Satellite System Support Equipment $1.0 million (P–1 line item 77).—The U.S. Navy Astronautics Group maintains and operates ground systems equipment for the Navy Navigation Satellite (NAVSAT) System at Point Mugu, California. This line provides funding for updating equipment, purchase of leased computer equipment when considered cost effective and procurement of test equipment for maintaining tracking/injection system equipment for the NAVSAT ground system.

Undersea Long Range Missile Systems (ULMS) $23.5 million (P–1 line item 78).—The FY 1973 estimate initiates the long-lead time equipment procurement of shipboard type training items [deleted].

The introduction of the ULMS submarine will substantially impact the requirements to train crews to operate the shipboard nuclear propulsion plants. The land based Naval Reactors prototype plants, used for the operational training phase of the Nuclear Propulsion Training Program, are owned and operated by the AEC primarily to provide research and test facilities for the AEC's Naval Reactors laboratories. These plants are also used for Navy Training purposes on a basis compatible with the AEC's research and test programs. The present growth of the nuclear Navy (exclusive of ULMS) is severly taxing the availability of prototypes for training. The addition of the ULMS submarine program makes it necessary that additional training capacity be provided.

The AEC has approval and is proceeding with development of the nuclear propulsion plant for ULMS. Considering the size and scope of the development program, [deleted].

Ordnance Support Equipment Financing

Chairman Ellender. According to my figures, of the total request of $560.6 million, $526.8 million was included in your discussion of the 10 major categories, as follows: Antisubmarine warfare, $202.8 million; expendable ordnance, $54.7 million; antiship missile defense, $137.6 million; spares and repair parts, $65.1 million; and fleet ballistic missile support, $66.6 million. This leaves a balance of only $33.8 million not discussed. Are my figures correct?

Admiral Minter. That is correct, Mr. Chairman.

Military Assistance Service Funded

Senator Young. On line 9 of the P–1 exhibit, there is a request of $3 million for military assistance, service funded programs. Please comment on the various items included in this request, and tell us the countries for which they are intended.

Admiral Woods. Various types of items are included in this procurement request. Some of them are: (1) Spare parts for rifles, pistols, machine guns, mortars, howitzers, 20-millimeter machineguns and mounts, (2) gun barrels caliber 0.50 (reduced range), (3) ammunition carried in Navy of all calibers through 5 inches, (4) chargers used on machine guns, (5) 40-millimeter linked ammunition, (6) underwater demolition materials, (7) depth charge component and other miscellaneous ordnance. These items are for the Republic of Vietnam.

ANTI-SHIP MISSILE DECOY SYSTEM

Chairman ELLENDER. On line 6 of the P–1 exhibit, I notice a request of $2.4 million for the antiship missile decoy systems. Please describe these systems.

Admiral WOODS. [Deleted.]

DEFENSE ATOMIC SUPPORT AGENCY

Senator YOUNG. Just what is involved in the request of $2.2 million set out in line 10 of the P–1 exhibit entitled "Defense Atomic Support Agency"?

Admiral WOODS. This line item supports procurement of material from AEC to maintain weapons, provide exercise warheads and procure spare parts for test and handling equipment. These programs include Subroc, Asroc, Astor, Polaris, Poseidon, Terrier, and Talos training. The largest single item of procurement is Subroc exercise warheads required for the dual purpose of fleet training and quality assurance service testing.

FIRE CONTROL EQUIPMENT

Chairman ELLENDER. On line 15 of the P–1 exhibit, there is a request of $2.6 million for "Surface guns systems fire control equipment." Please comment on the nature of this equipment.

Admiral WOODS. This line item provides funds for replacement of major components to fire control systems. Examples of major components are power drive equipment, radar antennas, stabilizing devices, and power supply equipment. Much of this equipment is of World War II and early post-World War II vintage. It has been overtaken by new technology. Some of the original material can no longer be procured on the commercial market, and therefore must be replaced by equipment of a design currently available. The funds in this line item are to provide replacement equipment for radar antennas (scanner units) for the gun fire control equipments MK 56, 63, and 68. The funds will complete procurement of radar antenna (scanner units) equipment for these systems which were procured on an incremental basis in prior years.

ORDNANCE ALTERATION MATERIAL

Chairman ELLENDER. Please comment on the request of $4.6 million for ordnance alteration material surface gun systems set out on line 16 of the P–1 exhibit.

Admiral WOODS. This line item provides funds for modifications to both inservice gun mounts and fire control equipment. The modifications are for safety, design improvements, operational improvements, and replacement of obsolete material at the subassembly level. The modifications are generally of a lesser degree of change than replacement of major components as commented on for fire control equipment. In common with fire control equipment, ordnance alteration material pertains chiefly to World War II and early post-World War II vintage equipment. Procurement of modification material is confined to ships expected to be active into the 1980's. The material maintains a minimum level of modernization and safety. Gun mounts from 20 millimeter to 5 inches inclusive and 8 inches are covered. For fire control, eight variations of systems applicable to the different caliber gun

mounts are covered. The funding is approximately equally divided between gun mounts and fire control.

Coast Guard Support

Senator Young. Just what is involved in the request of $700,000 for Coast Guard support?

Admiral Woods. $700,000 will be used to support Coast Guard originated requirements for the following equipments: 5-inch/38 gun mount, 5; 3-inch/50 gun mount, 3; MK–52 gun director, 4. Combatant ordnance equipment is carried aboard U.S. Coast Guard ships to enable rapid augmentation into the U.S. Navy in the event of war. As such, these equipments are carried as capital equipment provided and maintained using Navy funds. U.S. Coast Guard does not have similar or duplicate funding available to provide depot level maintenance for capital ordnance equipment.

Small Arms

Senator Young. Please comment on the request of $1 million set out on line 19 of the P–1 exhibit for small arms and small caliber weapons.

Admiral Woods. The request for $1 million for small arms and small caliber weapons is to maintain the present base in Navy for all weapons below 3-inch/50 shipboard guns and mounts. Some examples of the wide variety of ordnance items included in this category are: (1) Components for use in the overhaul and building of match grade pistols, rifles, and shotguns used in competition, (2) infantry type equipments—tents, knives, rifle and pistol belts—ammunition magazines for pistols, rifles, and machineguns, (3) grenade attachments for M–16A1 rifles for replacing the M–79 grenade launchers now in use, (4) dummy drill rifles used for training, (5) body armor for issue to aircraft crews and small boat operators, (6) replacement items—shields, feeders, chargers, ammunition chutes, adapters, (7) product improvements to the full range of minor ordnance used in Navy.

All procurements are for use by U.S. Navy forces ashore and afloat.

Fleet Mine Support

Chairman Ellender. What is included in the request of $6.1 million set out on line 22 for fleet mine support?

Admiral Woods. The request for $6.1 million for fleet mine support provides for procurement of material and services for assembly of mines in the stockpile, plus the explosive and inert loading of these mines. Continued operational testing of stockpile mines, operational evaluation and acceptance testing of components and systems under procurement, stockpile replenishment of components consumed in peacetime drill and exercise mine operations, and replacement of outmoded components are also included under this budget heading. The above material in fleet mine support is centrally managed by the ships parts control center for 2T-cognizance items and the naval mine engineering facility for 6T-cognizance components.

Swimmer Weapons Systems

Chairman Ellender. Please comment on the $1.2 million for swimmer weapons systems set out on line 23 of the P–1 exhibit.

Admiral Woods. The $1.2 million requested for swimmer weapons system (SWS) equipment provides explosive weapons and ordnance equipment for worldwide use by underwater demolition team/sea, air, land (UDT/SEAL) teams for naval special warfare missions, anti-submarine and antishipping operations, offshore/inshore reconnaissance and clearance operations in support of amphibious and special warfare, and as trained military advisers to other nations. The system is comprised of various sub-systems covering 70 separate items to support the foregoing broad operational areas. All items are waterproofed to 240 feet and are designed to be compatible with swimmer vehicles and submarine lock-out. There are three UDT's and two SEAL teams which are deployed with units of the 1st, 2d, 6th, and 7th fleets, and with NATO countries involved in the military assistance program. All teams are supported by this program.

Ordnance Disposal Equipment

Chairman Ellender. Just what is involved in the request for $2.5 million for explosive ordnance disposal equipment?

Admiral Woods. The request for $2.5 million for explosive ordnance disposal (EOD) equipment provides for the preparation of joint-service explosive ordnance disposal publications which give EOD personnel of all military services the information and procedures required to render safe both U.S. and foreign ordnance. It provides for the initial procurement of newly developed EOD tools and equipments, including the associated costs of documentation and procurement support. Procurement of hardware for evaluations is also included.

Beginning in fiscal year 1973, the Navy will be responsible to the Department of Defense for all EOD technology and training. There will be increased requirements in the publications area and in documentation and procurement of evaluation hardware. EOD publications will be prepared on approximately 500 new items of ordnance. Procurement of initial fleet outfitting of the explosive remote opening device will begin. Documentation will be prepared and evaluation hardware procured for the underwater and surface delay firing device and portable steam generator. Procurement support and maintenance of documentation will continue as in fiscal year 1972.

Seaborne Target

Senator Young. Please comment on the request of $1.9 million for the unmanned seaborne target set out in line 30 of the P–1 exhibit.

Admiral Woods. These funds are required for the procurement on a continuing basis of unmanned seaborne targets for use in fleet training and naval weapon system tests and evaluations. The numbers to be procured are to replace annual target expenditures. [Deleted.] Also included are several types of towed sleds for gunnery training.

Transportation

Chairman Ellender. On line 34 of the P–1 exhibit, I note a request of $1 million for first destination transportation. What items are included in this transportation request?

Admiral Woods. This item provides for the cost of transporting all inert and explosive items from the supplier to the first Navy destination or to contractors for inclusion as a part of an end item in production.

MK-22 Machinegun

Chairman Ellender. $1.4 million is requested for the procurement of 226 Mk–22 20-mm. machineguns. The weapons data sheet will be included in the record at this point.

(The information follows:)

Fiscal Year 1973 President's Budget Estimate—Data Sheet

Service: Navy—Nomenclatures Machine Gun 20 MM 22 MK Mod 0, P–1 Line Item No. 40; Popular Name: MK 22 M.G.

Description/Mission.—The Mk 22 Machine Gun is a lightweight, air cooled, self powered gun that fires either percussion (preferred for surface use) or electric primed M50 series ammunition. The gun is of modular construction to facilitate ease of maintenance. This gun is the successor to the Mk 4 and Mk 16 20MM Navy Surface guns used on small craft, auxiliary, amphibious and other types of vessels for defensive armament. The Mk 4 and Mk 16 guns and their associated ammunition (in service over 25 years) have reached the end of their safe life. The phase-out of the Mk 4 guns has commenced and the only gun remaining is the Mk 16. The M90 series ammunition used in the Mk 16 is not bore safe due to the type fuze incorporated in the projectile. [Deleted.] This 20 MM machine gun replaces all existing guns in the US Navy Ships and those used in all riverine craft applications. 20MM armament is the only defensive weapons installed in many Navy Ships and Craft. The gun is belt fed and requires only one operator to load and fire out up to approximately 375 rounds without reloading. The gun will be mounted in the Gun Mount MK 67 Mod 0, backfitted into Mk 68 Mod 0 and paired in the Mk 56 Mod 2 mounts.

COST DATA

[In millions]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate, total program
Gun Procurement:										
Quantity	20		40	226	140	140	140	140	350	1,196
Cost	1.5		.2	1.4	.8	.8	.8	.8	2.0	8.3
Procurement unit cost	.075		.005	.006	.006	.006	.006	.006	.006	.007
Weapon system cost	1.5		.2	1.4	.8	.8	.8	.8	2.0	8.3
Initial spares										
R.D.T. & E										
Milcon										
Program acquisition cost	1.5		.2	1.4	.8	.8	.8	.8	2.0	8.3
Program unit cost										.007
Total additional cost										

Basis for FY 1973 Budget Request.—The quantity of guns is required to provide guns to Navy Ships and Craft (replacing MK 4 and Mk 16 guns) for defensive armament purposes.

Fiscal Year 1973 President's budget estimate—data sheet

Test data:

Gun designed	May 1967.
Engineering test completed	July 1971.
Evaluation tests (Tech Eval) complete	November 1971.
Operational evaluation	Not required.
Release to service use	June 1972.

Contract data: Machine Gun MK 22–0: Contractor: NAVORD Station, Louisville, Ky. Type contract: Work request.

	Class	Operational requirement	Demonstrated
Performance:			
Rate of fire	U	300–700 SPM	300–700 SPM.
Range (maximum)		8,000 yards	8,000.
Muzzle velocity		3,410 to 3,500 feet per second	3,410–3,500.
Accuracy		2 mils at 1,000 yards	2 mils at 1,000 yards.
Characteristics:			
Weight of total gun assembly	U	126 pounds	
Length of gun (overall)	U	76 inches	
Barrel weight	U	16.5 pounds	
Barrel	U	Quick change	
Headspace	U	Fixed	
Gun life	U	25,000 rounds	
Special tools	U	None	
Links	U	MK–9 mod 0	
Number operator	U	1 man	

Requirements, production data, losses and assets.

Inventory objective/requirements.

Inventory objective, end of fiscal year 1973 funded delivery period (FDP), 266 guns.

Production data and deliveries

Production data, fiscal year	Total procurement	Fiscal year 1971 and prior	1972 (quarters)				1973 (quarters)				1974 (quarters)				1975	1976	1977	Beyond 1977
			1	2	3	4	1	2	3	4	1	2	3	4				
R. & D. test items:																		
Procurement:																		
Fiscal year—																		
1970 and prior	20	20																
1971																		
1972	40								20	20								
1973	226									40	60	66	60					
1974	140													60	80			
1975	140														140			
1976	140															140		
1977	140																140	
Balance	350																	350
Inventory losses (during year)	225	20								5				20	30	30	30	90
Assets (end of year)										75				301	491	601	711	971

Cost history comparison	Quantity	Amount (millions)
Initial planning estimate (1967):		
Procurement	2,542	$16.4
R.D.T & E		
Milcon		
Total program cost		16.4
Current estimate, total program (fiscal year 1972 budget submission):		
Procurement	400	2.8
R.D.T. & E		
Milcon		
Total program cost		2.8
Current estimate, total program (fiscal year 1973 budget submission):		
Procurement	1,196	8.3
R.D.T. & E		
Milcon		
Total program cost		8.3

Since the time of the initial planning estimate (1967), the program quantity has decreased from 2542 guns to the current quantity of 1196 due to de-commissioning of large numbers of fleet ships and the reduction of US NAVAL forces in southeast Asia. The low quantity and dollars associated with the FY 1972 estimate result from program data associated with the expected procurement through FY 1974, which was used at that time. The current estimate (FY 1973) reflects total program cost through FY 1980.

AUTHORIZATION REQUIREMENT

Chairman ELLENDER. As I recall, this item requires 412 authorization. Am I correct about this?

Admiral WOODS. Yes, sir; the Mk 22 machinegun requires 412 authorization to procure.

MISCELLANEOUS ITEMS

Senator YOUNG. On line 42 P–1 exhibit, there is a request for $1.1 million for procurement of items less than $500,000. Give us several examples of the types of items you expect to procure with these funds.

Admiral WOODS. Examples of these items are: (1) rifles, M16A1 for delivery to South Vietnam—this item is included here rather than in line item 9 because it requires 412 authorization to procure; (2) gun mounts Mk 46 Mod 3, gun mounts Mk 56–0, gun mounts 26–10, gun mounts Mk 67–0 and 1, gun mounts 58 Mods—all of these gun mounts are for 20 millimeter, caliber .50 and 7.62 millimeter machineguns now in use; (3) machinegun Mk 23–0 caliber 5.56 millimeter for special forces; (4) machine M60 7.62 millimeter—this is the Navy's standard light machinegun ashore and afloat; (5) 40 millimeter machinegun Mk 19–2 this gun is being procured in limited quantity to prove producibility of drawing package. The Mod 2 is vastly improved over the Mod 1 now in service use.

ASW SHIP LAUNCHED ORDNANCE EQUIPMENT

Chairman ELLENDER. The total requested for this budget activity includes $194.2 million for ASW ship launched ordnance and related equipment. How much was provided for this type equipment for fiscal years 1972 and 1971?

Admiral ARMSTRONG. In fiscal year 1972 the Navy was provided $188.8 million and in fiscal year 1971 a total of $170.5 million.

Chairman ELLENDER. As I recall now, this total of $194.2 million was included in your total of $527.4 million for ASW support. Am I correct?

Admiral ARMSTRONG. Yes, sir; you are correct. The $194.2 million is included within the $527.4 million.

TORPEDO AUTHORIZATION

Senator YOUNG. As I recall, all torpedoes now require 412 authorization. Please identify those items in line numbers 43 through 57 which require 412 authorization.

Admiral ARMSTRONG. All items in line numbers 43 through 57 require 412 authorization. However, only line Nos. 45 and 49, torpedo Mk 48 and mobile target Mk 30 respectively have data sheets submitted since they are the only items that are quantity related.

TORPEDO SUPPORT

Senator YOUNG. Just what is involved in your request of $9.9 million for torpedo support?

Admiral ARMSTRONG. The torpedo support line item provides for support of those inservice torpedoes and targets which are no longer in production. These funds are required for hardware procurement to support the turnaround of [deleted] torpedoes used in fleet exercise firings. Included are such items as: support of the 3D range at NTS Keyport; replacement of items expended for exercise/training firings, surveillance tests and replacement of overage material; that is, batteries, exercise heads and dummy torpedoes, et cetera. Specifically, the inservice torpedoes supported and the funds totaling the $9.9 million are listed as follows: Mk 14/16, $0.4 million; Mk 37, $1.7 million; Mk 44, $0.5 million; Mk 45, $2 million; Mk 46, $3 million; general support, $2.3 million.

TORPEDO ALTERATIONS

Senator YOUNG. Comment on the $4.5 million requested on line 47 for torpedo alterations.

Admiral ARMSTRONG. The torpedo ordalt line item provides funding for procurement of field change kits for modification and correction to increase safety or performance characteristics of inservice torpedoes and targets and upgrade the corresponding workshop and test equipment. Of the $4.5 million requested in fiscal year 1973, $3.5 million is for the procurement of phase II Ordalts for the Mk 46 torpedo. The phase II Ordalt consists of [deleted] changes [deleted] designed to enhance target detection [deleted]. The remaining $1 million is required for various minor improvements to the Mk 14 and Mk 37 torpedoes.

MK-27 MOBILE TARGETS

Chairman ELLENDER. What is involved in the $3 million requested on line 48 for the mobile target, MK 27?

Admiral HALVORSON. Fiscal year 1973 funds for Mobile Target MK 27 will be used to refurbish 15 MK 27 targets remaining after conclu-

sion of the MK 48 torpedo evaluation. It is considered more economical to refurbish 15 existing targets at a cost of $2.1 million as opposed to an acquisition cost of new production units estimated at $6 million. The work will be done at the designated target depot, NTS, Keyport, and will commence at a rate of two targets per month, beginning in July 1972. The remaining $0.9 million requested in fiscal year 1973 is for engineering support and technical direction at NUSC, Newport and environmental testing at NTS, Keyport. These targets, which were procured in fiscal year 1968 and prior years as pre-production units, have been used for all MK 48 torpedo firings up through and including OPEVAL. They are beginning to exhibit degraded performance due to extensive use, and require refurbishment. It is considered to be both economical and feasible to restore these targets for continued use by completely disassembling and rebuilding/replacing the components and replacing the acoustic and recording system, power switches and hydrophones in order to bring them up to a production configuration.

MK–30 Mobile Target

Chairman Ellender. $8 million is requested for the procurement of 16 MK 30 mobile targets. The weapons data sheet will be included in the record at this point.

(The information follows:)

Fiscal Year 1973 President's Budget Estimate Data Sheet

Service: Navy.
Nomenclature: ASW Mobile Target MK 30.
P–1 Line Item No. 49.
Popular Name: ASW Mobile Target MK–30.

Description/Mission.—The MK–30 Mobile ASW Target Vehicles will provide air, surface, and submarine ASW units with a means to conduct realistic ASW exercise firings on ranges. Since ASW training exercises and torpedo firings are severely restricted by the non-availability of submarine services and safety considerations, procurement is required for a mobile ASW target which will provide basic training and compatibility with all ship/submarine/aircraft sensors and applicable torpedo weapons. This target also provides the simulated magnetic moment of a submarine for Magnetic Anomaly Detection (MAD) by aircraft having this equipment.

COST DATA

[In millions]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate total program
Target procurement:										
Quantity	3	6	25	16	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]
Cost	3.1	4.5	14.0	8.0	12.0	12.0	12.0	12.0	12.0	89.6
Procurement unit cost	1.033	.750	.560	.500	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]
Weapons systems cost	3.1	4.5	14.0	8.0	12.0	12.0	12.0	12.0	12.0	89.6
Initial spares	.5	.4	1.0	.5	1.3	2.2	1.8	1.9	1.9	11.5
R.D.T. & E	9.3									9.3
Milcon										
Program acquisition cost	12.9	4.9	15.0	8.5	13.3	14.2	13.8	13.9	13.9	110.4
Program unit cost										[deleted]
Total additional cost										[deleted]

Basis for fiscal year 1973 Budget Request.—The fiscal year 1973 procurement is a follow-on buy to meet fleet training requirements particularly for the MK–48 Torpedo fleet introduction and training. These targets are required for realistic training and testing at controlled 3D ranges and are a direct substitution for submarine services.

TEST DATA

MK–30 Mod 0

Technical Evaluation completed in September 1969.

Two targets procured with RDT&E,N funds successfully operating at BARSTUR.

Three production models accepted during November and December 1971.

MK–30 Improved

Deep depth tests expected to complete January 1972.

High speed tests expected to complete April 1972.

Acoustic system tests planned for completion April 1972.

CONTRACT DATA

Major System: Vehicle; Contractor, Northrup-Ventura; Type of last contract, Fixed price incentive.

Major subsystem: Acoustics: contractor, Honeywell, Seattle, Wash.; Type of last contract, Fixed price incentive. Motors: Contractor, Bogue Electric, New Jersey; Type of last contract, Fixed price incentive.

	Class	Operational requirement		Demonstrated
		MK–30 mod 0	MK–30 improved	
Performance:				
Depth	C	1,500	[Deleted.]	
		4 hours at 7 knots	[Deleted.]	
Endurance	C	1 hour at 20 knots	[Deleted.]	
Speed (water)		7–20 knots	7–30 knots	7–20 knots.
Acoustics	C	3.5–14 KC	[Deleted.]	
Characteristics:				
Engine horsepower/fuel.	U	50 horsepower, electric	105 horsepower, electric.	
Length	U	226 inches	245 inches.	
Diameter	U	21 inches	21 inches.	
Weight	U	2,500 pounds	2,795 pounds.	

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE DATA SHEET

Requirements—Production Data—Losses and Assets.

Inventory objective/requirements.

Inventory Objective End of fiscal year 1973 FDP 150–200.*

*A full concept of how the target will be used is still being formulated. However, based on preliminary evaluations using current understanding of how this target will be used for proofing and training, an on-hand inventory of approximately [150–200] appears desirable.

PRODUCTION DATA AND DELIVERIES

	Total procurement	Fiscal year 1971 and prior	Fiscal year 1972 (quarter) 1	2	3	4	Fiscal year 1973 (quarter) 1	2	3	4	Fiscal year 1974 (quarter) 1	2	3	4	Fiscal year 1975	Fiscal year 1976	Fiscal year 1977	Beyond fiscal year 1977
R. & D. test items	2	2																
Procurement items:																		
1970 and prior	3	3																
1971	6						6											
1972	25						[Deleted]											
1973	16																	
1974	[Deleted]																	
1975																		
1976																		
1977																		
Balance																		
Inventory losses (during year) [1]	0																	
Assets (end of year)	5	[Deleted]																

[1] Loss rate is based on an assumption of 1 percent losses for use on 3D ranges only. Losses in off range, open ocean use are expected to be about 3 to 5 percent. However, insufficient data exists to accurately predict loss rate at this time.

Cost history comparison	Quantity	Amount (millions)
Initial planning estimate:		
Procurement	200	$100.0
R.D.T. & E.	2	9.3
Milcon		
Total program costs		[1] 109.3
Current estimate, total program (fiscal year 1972 budget submission):		
Procurement	[Deleted]	100.5
R.D.T. & E.	2	9.3
Milcon		
Total program costs		109.8
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	[Deleted]	100.6
R.D.T & E.	2	9.3
Milcon		
Total program costs		[1] 109.9

[1] $500,000 increase is a result of design improvements to the basic MK-30 targets to provide for improved acoustical performance and a deeper diving capability.

MK–30 Target Application

Chairman Ellender. It is my understanding that this MK–30 target will permit the exercise of all torpedoes and sonars now assigned to the fleet including the new MK–48 torpedo. Am I correct about this?

Admiral Armstrong. Yes, sir; Mr. Chairman, this is correct.

Senator Young. Tell us just how this target is used.

Admiral Armstrong. The MK–30 mobile target can be launched from a submarine or surface ship using the gravity rack or the impulse launching technique. To date, the two targets located at Barstur have been launched from a YAG and torpedo retriever using the gravity rack launching method. These targets are preprogramed prior to launch and can be preset to run at variable speeds and depths. The target simulates a submarine in dynamic performance, active sonar response and MAD signature characteristics and has been used extensively for ASW training and weapon evaluations. The following platforms have utilized the MK–30 target in a single unit and multiunit coordinated ASW exercises: Destroyers, nuclear frigates, submarines, helicopters, and both carrier-based (VS) and shore-based (VP) aircraft. In addition, the MK–30 target has been used to exercise the following ASW weapons: MK–37, MK–44, MK–46, and MK–48, torpedoes as well as ASROC missiles.

Chairman Ellender. I note that the fiscal year 1973 program is based on a unit cost of $500,000 for each target. How does this compare to the fiscal year 1972 cost?

Admiral Armstrong. The $500,000 unit cost which appears in the budget is arrived at by dividing total quantity into total dollars budgeted. This is not an accurate unit cost, since the $8 million budgeted includes $1.7 million for Navy in-house technical direction, proofing of targets procured in prior years, and expendables for use in range operations. With these costs excluded, the comparable projected cost per target from the contractor is approximately $391 thousand for fiscal year 1973 as opposed to $516 thousand for fiscal year 1972.

Senator YOUNG. How often do you lose one of these targets during training exercises?

Admiral ARMSTRONG. The MK–30 target has been used as a training vehicle since March 1970. As of March 31, 1972, the two targets at Barstur have experienced a total of 154 runs without a single loss. Further, the two targets have demonstrated high reliability and quick turnaround capability. These targets have experienced 213 hours of operation during the past 24 months of operations, with reliability continuously improving. During the last 6 months of operation, these targets achieved 88.7 percent of the desired run time—55 of 62 hours.

MK–30 IMPROVED TARGET

Chairman ELLENDER. I note on page 2 of the data sheet a reference to the "MK–30 improved." Is this the target you plan to buy with the $8 million being requested?

Admiral ARMSTRONG. Yes, sir. All fiscal year 1972 and subsequent MK–30 target procurements are the "improved" version.

Senator YOUNG. I note that the performance requirements for the "MK–30 improved" target for depth, endurance, speed, and acoustics have not been fully demonstrated. Would you please comment on this matter?

Admiral ARMSTRONG. Demonstration of deep-depth capability has been successfully achieved both hydrostatically and operationally. These tests were completed in January 1972. A dynamometer test (in tank) of endurance and speed was successfully demonstrated for nearly 29 minutes of 30 minutes required. This test was run at 10 percent excess load resulting in the battery overheating. The battery design has been modified to provide cooler operation of the battery prior to further testing. Present plans are to demonstrate both speed and endurance (in water testing) in the late May/early June 1972 time frame. Testing of target acoustics has been partially successful as of this date. Technical difficulties have been solved and the completion of testing is scheduled in late May.

MK–48 FIRE CONTROL AND LAUNCH EQUIPMENT

Chairman ELLENDER. On line 50 of the P–1 exhibit there is a request of $2.5 million for MK–48 fire control and launch equipment. Please comment on this item.

Admiral HALVORSON. The MK–48 fire control and launch equipment line item provides funding for phased procurement of Ordalt kits to modify existing submarine fire control systems to achieve compatibility with the MK–48 mod 1 antisubmarine/antisurface ship torpedo. The following fire control systems apply: MK–101, MK–106, MK–112, and MK–113. The $2.5 million in fiscal year 1973 provides for funding of changes to the ballistic data in the fire control system and engineering technical services during fire control installations. These ballistic changes result from the finite information emanating from the operational evaluation.

Chairman ELLENDER. Is this the type of equipment that must be installed on existing submarines to give them the capability to fire the new MK–48 torpedo?

Admiral HALVORSON. Yes, sir. Perhaps more accurately it is modification of the fire control equipment already on board the submarines which provides the capability to fire the MK–48 torpedo.

TORPEDO SUPPORT

Senator YOUNG. Please comment on the request of $3 million for ordance alteration material and $3.5 million for torpedo tube support.

Admiral ARMSTRONG. These funds provide for alteration kits to modify and improve ASW fire control equipments and associated launchers in the fleet. These alteration kits correct deficiencies which become known as a result of evaluation, test and service use, and also provide modifications necessary to achieve compatibility arising from the introduction of new or modified weapons. In addition to funding for production of alteration kits, this line item provides necessary services to install kits in the fleet and to update the equipment documentation affected by the alteration.

The $3.5 million requested in fiscal year 1973 for torpedo tube support provides support for approximately 130 submarines and 228 surface ships plus Coast Guard cutters for torpedo tube alterations, new system components, for surface vessels and submarines which are no longer within the funding responsibility of the SCN appropriation. The fiscal year 1973 request provides for procurement of test equipment, Ordalts for tubes, weapons handling equipment, documentation, and includes the first procurement of the torpedo tube quieting Ordalt for [deleted] submarines, which is part of the Navy's overall submarine quieting program.

BARKING SANDS TACTICAL UNDERWATER RANGE

Chairman ELLENDER. Line 54 of the P–1 exhibit includes a request of $1 million for support of the Barking Sands Tactical Underwater Range. Where is this range located, and what is its primary function?

Admiral ARMSTRONG. The Barstur range is a component of the Pacific Missile Range located at Kauai, Hawaii. The underwater range portion is located in a 5-by-10-mile area approximately 10 miles off shore in water depths of 400 to 1,000 fathoms.

The range provides the Navy an area in which to conduct combined air, surface, and subsurface ASW operations in a controlled environment. It has facilities to track and record positions of surface ships, submarines, weapons and aircraft simultaneously to enable the Navy ASW forces to develop and improve submarine detection and destruction tactics, to monitor the performance of weapons and torpedoes, and to determine operational readiness.

Senator YOUNG. Just what will you be doing with the $1 million that you requested for the support of this installation during fiscal year 1973?

Admiral ARMSTRONG. The principal areas of support in fiscal year 1973 include procurement of acoustic pingers and torpedo extenders for use by the range in torpedo firings. The torpedo extenders when inserted into the torpedo provide a cavity for acoustic pingers. The acoustic pingers transmit a high frequency sound wave so that the MK–44 and MK–46 torpedoes can be tracked and evaluated in a three-dimensional environment.

MISCELLANEOUS ITEMS

Chairman ELLENDER. On line 57 of P–1 exhibit, there is a request of $1.7 million for the procurement of "Items under $500,000 each." Give us several examples of types of items you expect to be procuring with these funds.

Admiral ARMSTRONG. I will be happy to do so. Procurement will be made of miscellaneous items of hardware costing less than $500,000, typical examples of which are: (1) Modernization and updating MK–4 torpedo computers; (2) modernization and updating attack consoles MK–38 and MK–53 used with fire control systems MK–111 and MK–114; (3) items of test equipment used in the weapon system accuracy trials (WSAT) and consolidated operability test (COT) programs; (4) ASROC depth charge MK–17 components and adaption kits required to replace those consumed in surveillance testing required by the Atomic Energy Commission (AEC); (5) modernization and updating fire control systems MK–101 and MK–106; and (6) fire control system MK–113 equipment for use in the in-service engineering facility at Newport.

OTHER SUPPORT EQUIPMENT

Chairman ELLENDER. The total requested for this budget activity includes $80.5 million for a category entitled "Other support equipment." Of this total, $3 million requested for surface missile system training aids and devices, and $65.1 million requested for spares and repair parts were discussed previously in connection with the 10 major categories. Am I correct about this?

Admiral MINTER. Yes, Mr. Chairman; that is correct.

PRODUCTION FACILITIES AND EQUIPMENT

Senator YOUNG. On line 61 of the P–1 exhibit, there is a request of $6.4 million for production facilities and equipment. Comment generally on the nature of this equipment, and then include a statement for the record giving the details of the various items included in this request of $6.4 million.

Admiral WOODS. The $6.4 million for production facilities and equipment is basically comprised of the following: (a) Replacement and restoration of antiquated and worn equipment in the amount of $4.7 million required to maintain, renovate, overhaul and assemble ammunition, bombs, torpedoes and explosive charges; and (b) capital maintenance for nonrecurring type facilities maintenance of a capital nature in the amount of $1.7 million which includes necessary emergency repairs, safety and fire protection and minor improvements.

CALIBRATION EQUIPMENT

Chairman ELLENDER. Please comment on the request of $1.6 million for calibration equipment set out on line 62 of the P–1 exhibit.

Admiral WOODS. These funds are required for the purchase of laboratory standards and measurement equipment to support the Navy calibration program managed by NAVORD. The equipment is used to calibrate the checkout and test equipment which supports the ordnance and weapons systems and assures uniform measurement, both on

shipboard and ashore. Calibration insures that the test equipment continues to operate to original design specifications and makes certain that, when checked out by this equipment, the weapons systems thus supported are combat ready. The introduction and development of new weapons systems and sophisticated test requirements generate the need for new equipments. Any significant breakdown in the accuracy of measurement equipment would have a deleterious effect on fleet readiness and training operations. The life of the majority of the equipment varies between 6 and 10 years. Replacement equipment and new equipment must be procured regularly in order to stay abreast of the state-of-the-art in all measurement areas. The calibration equipment is supplied to three standards labs and 14 calibration labs as replacements for worn or obsolete equipment or new equipment to meet requirements of new weapons systems. Of significant note is that this year's budget allows for procurement of automated test equipment which will reduce calibration times of oscilloscopes and meters by better than 80 percent. This equipment, recently designed and proofed will reduce the backlog of equipments not being calibrated due to funding shortages in the calibration budget. To hold equipment costs to a minimum, the Metrology Engineering Center, Pomona, has been given the mission of central procurement of equipment for the calibration program. The Metrology Engineering Center conducts an evaluation on the equipment to insure that it is the best, cost considered, for the weapon requirement. Volume purchases result in lower unit prices. Standardized inventories result in requirements for fewer instrument calibration procedure documents.

Stock Surveillance Equipment

Senator Young. What is involved in the request of $2.2 million for stock surveillance equipment set out in line 63 of the P–1 exhibit?

Admiral Woods. These funds are required for the purchase of test equipment for accomplishment of the stock surveillance missions assigned to the quality evaluation and engineering laboratories (QEEL) under NAVORD management. The equipment will be used for testing and evaluation of Navy-owned stocks of all types of weapons materials and systems ranging from conventional fuzes to complex missile systems and nuclear weapons. The advances in the state of weapon design and the resultant modern weapons in the stockpile require the continuing alteration of test facilities to maintain an adequate capability. The QEEL surveillance tests are required to assess safety, reliability and readiness. The programs are designed to determine and evaluate rates and modes of deterioration and weapon system performance through laboratory simulation and by monitoring and analyzing actual weapon performance (training firings and fleet exercise). The increased complexity of weapons systems and increased DOD emphasis on realistic simulation and demonstration of reliability and weapon system effectiveness requires an increased laboratory capability to accurately simulate operational requirements and measure responses to close tolerance. Because of the increased performance capability to meet numerous threats, more parameters and subsystems have to be tested necessitating automated test equipment with the

capability of providing complex stimuli and accurate measurement of response. In addition to maintaining a state-of-the-art test capability, there is a great demand for replacement of obsolete, worn, or damaged equipment. The equipment will be used to test such weapons as Asroc, Subroc, Terrier, Tartar, Talos, Standard Missile, Aegis, Point Defense, various torpedoes, mines, other NAVORD cognizant weapons system components. The equipment is also used to collect fleet exercise performance data. The increased complexity of fleetexes in simulating actual attack environments requires additional and advanced equipment to collect and analyze performance data. Requirements for fleetex data have increased in scope thus requiring modifications and new equipments to collect additional data, increase analytical capability and reduce the number of fleet personnel engaged in manual data collection.

Naval Reserve Equipment

Chairman Ellender. Please comment on the request of $0.4 million for Naval Reserve equipment.

Admiral Woods. This request provides for the initial requirement of night vision devices for Naval Reserve Inland Underseas Warfare Divisions (NRIVW). The NRIVW Divisions are mobilization day increment (MDI) forces of the Ready Reserve. Upon mobilization, they are tasked to provide surveillance of straits, roadsteads, amphibious objective areas, over-the-beach loading sites and anchorages. This equipment is required to provide increased capability for night action operations and low light conditions.

Fleet Ballistic Missile Support Equipment

Charman Ellender. $66.6 million is requested in budget activity 4 for fleet ballastic missile support equipment. As I recall, this total was included in your discussion of fleet ballistic missile support. Am I correct about this?

Admiral Minter. That is correct. Of the $66.6 million requested in budget activity 4, $43.1 million is for support of the existing POLARIS and POSEIDON weapon systems, and $23.5 million is for the previously discussed ULMS training requirement.

Refresher Training Equipment

Senator Young. On line 69 of the P–1 exhibit there is a request of $19.6 million for refresher training equipment. Just what do you mean by the term "refresher training"?

Admiral Minter. Refresher training is that training by which FBM crewmembers maintain and improve their performance capabilities by reviewing and being brought up to date in methods and procedures and by training in advanced or improved operation, maintenance, and casualty techniques. The training is conducted at the three FBM refresher training facilities during off-crew periods.

Chairman Ellender. How much of this total is for equipment at each of the three facilities, New London, Charleston, and Pearl Harbor?

Admiral MINTER. Of the $19.6 million, $18.7 million is for equipment procurements for the Charleston navigation operational trainer, refresher maintenance laboratories and weapons control subsystem trainer, and the balance is for procurements for New London. No funds are requested in fiscal year 1973 for the Pearl Harbor refresher training facility.

598 AND 608 CLASS OVERHAUL

Chairman ELLENDER. I note a request of $100,000 for 598 class overhaul and $1.4 million for 608 class overhaul. Please comment on these two items.

Admiral MINTER. The OPN appropriation supports procurement of weapon system associated equipments required for replacement or refurbishment of wornout equipment and procurement of new or modified hardware which will be installed during regularly scheduled overhauls of FBM submarines and tenders. For procurement of fire control and missile checkout equipment items, $100,000 is requested in fiscal year 1973 in order to complete the second overhaul of the last of the 598 class submarines, SSBN 602. Second overhaul cycle for 608 class submarines [deleted]. During this second overhaul, alteration kits for fire control and missile test and readiness equipment must be procured in order to incorporate A–3 capability into the existing weapon system, which currently has an A–2 capability. The majority of required procurements for second overhaul of the 608 class were funded in fiscal year 1971 and fiscal year 1972. Remaining procurements are in general scheduled approximately 1 year before the start of the overhaul for a particular submarine.

ALTERATION EQUIPMENT

Senator YOUNG. What is involved in the request of $11.4 million for alteration equipment?

Admiral MINTER. The requested $11.4 million funds the procurement of alterations to non-flying weapon system hardware. The POLARIS alteration program provides for procurement of repair part alterations for piece parts that are unavailable from present stocks and are no longer in production. Although the design of the POLARIS weapon system is now essentially frozen, the unavailability of parts due to obsolescence and parts-standardization programs has required and will continue to necessitate unwanted but unavoidable SPALT's to preserve system reliability and configuration control. The POSEIDON alteration program is directed toward design modifications that will assist in eliminating personnel safety hazards, correcting design deficiencies to achieve performance objectives, enhancing system effectiveness by improving equipment operability, and achieving logistic economies and increased reliability. Estimates for POSEIDON alterations are based largely on experience in the initial deployment of the POLARIS weapon with allowance for the higher performance criteria for the improved system and adjusted to incorporate the limited POSEIDON operating data available to date. As additional operating experience is obtained, funding estimates for subsequent years will be adjusted accordingly. The most important single item in the fiscal year 1973 request is $5.2 million for procure-

ment of tactical loran phase shift system equipments to be installed tenderside on hulls of the 627 and 640 classes.

Maintenance and Support Equipment

Chairman Ellender. Please comment on the $3.6 million for maintenance and support equipment.

Admiral Minter. Funds requested for maintenance and support equipment principally provide for procurement of various equipments used for maintenance, calibration, test or handling aboard deployed FBM submarines and tenders as well as at shore installations and also for certain principal stock items. Primary items included in the requested fiscal year 1973 funds are: $396,000 for equipment procurements for the module maintenance facility at Charleston; $1,418,000 for procurement of navigation subsystem non-inertial principal stock items and optical instruments and for modification of A–3 stock components for C–3 support. Funds are also required for updating, replacing, and improving the existing navigation test equipment and tools; and $754,000 for replacement of various missile checkout support equipments for submarines, tenders, and shipyards.

Test and Training Expendables

Chairman Ellender. Just what is involved in the request of $3 million for test and training expendables?

Admiral Minter. Funds requested for test and training expendables provide for replacement or refurbishment of launching subsystem hardware utilized by deployed SSBN crews during test shots. Funds are included for procurement of material used in launching both missiles and water slugs. Water slug launches provide test and checkout of the individual launch tubes and the launcher subsystem under conditions similar to actual missile launch sequence to provide training for SSBN crews and to test FBM system readiness without actually test firing missiles. Actual missile launch testing is conducted during demonstration and shakedown operation (DASO) testing following overhaul. Items expended during test firings include gas generator reloads, casting powder, EBW squibs, conax valves, launch tube closures, diaphragms, water slugs, foam wafers and inflatable seals. Fiscal year 1973 funds are requested for POLARIS sabots and POSEIDON gas generator reloads and launch tube closures and casting powder procurements based on leadtime requirements to meet expendable testing scheduling. The major portion of the fiscal year 1973 request is the reload of POSEIDON gas generators at a total cost of $2,501,000.

Navigation Satellite Support

Senator Young. Please comment on the request of $1 million for navigation satellite support.

Admiral Minter. The U.S. Navy astronautics group maintains and operates ground systems equipment for the Navy navigation satellite system at Point Mugu, California. The $1 million requested will procure a number of computer equipments necessary for the replacement of an obsolescent computer at Point Mugu.

BUDGET ACTIVITY 5—CIVIL ENGINEERING SUPPORT EQUIPMENT

Chairman ELLENDER. The total request for "Other Procurement, Navy," includes $50.4 million for budget activity 5 entitled "Civil Engineering Support Equipment." Pages 2 and 3 of the justification will be inserted in the record at this point.

(The information follows:)

Budget activity 5: Civil engineering support equipment

[In thousands]

Fiscal year 1973 estimate	$50,400
Fiscal year 1972 estimate	40,100
Fiscal year 1972 actual	49,370

Purpose and Scope of Work

Funds provided under this budget activity are for procurement of passenger carrying vehicles, trucks, trailers, construction, earth moving, fire fighting, weight handling, Navy-wide amphibious and specialized amphibious construction battalion equipment, combat construction support equipment, telephone equipment, nuclear biological and chemical warfare defense equipment, mobile utilities support equipment, Military Assistance Service Funded equipment, fleet moorings, public works shop equipment and collateral equipment for Military Construction Projects. This equipment is procured for Navy-wide use of the Shore Establishment and Operating Forces (excluding the Marine Corps).

Justification of Funds

Passenger Carrying Vehicles—$2.9 million (P–1 line item 1).—This program provides for the procurement of passenger carrying vehicles for the entire Navy (except the Marine Corps) and includes metropolitan ambulances for the Navy and Marine Corps. The funds requested will provide for the replacement of 852 vehicles out of a total inventory of 7,663 vehicles.

Trucks, Trailers, Construction and Maintenance Equipment—$33.6 million (P–1 line items 2–13).—This category includes trucks, trailers, crushing equipment, drilling equipment, earth moving equipment, generators, fire fighting equipment, weight handling equipment and their associated spares and first destination transportation costs. The FY 1973 request provides the Naval Construction Forces, Naval Shore Activities, and various other Operational Forces with vehicles and equipment necessary for the accomplishment of their assigned missions and to maintain these forces at required readiness levels. This request represents the minimum replacement program necessary to maintain an acceptable inventory position. For example, out of an inventory of 38,086 trucks only 3,215 are to be replaced in FY 1973, and out of an inventory of 5,105 units of earth moving equipment only 342 will be replaced.

Amphibious, Specialized, and Combat Construction Equipment—$3.4 million (P–1 Line items 14 and 15).—These funds are required to provide the Naval Construction Forces with equipment necessary to maintain these forces at the required readiness to accomplish their assigned missions. Equipments to be procured in FY 1973 include pontoon structures, fuel systems, and Tactical Support Functional Component Assemblies such as bunkers and towers.

Justification of Funds

Other Equipment—$10.5 million (P–1 line items 16–22).—The other programs in this budget activity include collateral equipment, funded at $4.1 million, which provides equipment and furnishings to outfit Military Construction Projects. The Military Assistance Service Funded (MASF) Program includes $2.0 million as part of the Vietnamization program. The Mobile Utilities Support Equipment Program which provides power for emergency situations, as well as in other special circumstances, is funded at $1.1 million. Modernization and expansion of the Navy telephone systems to replace out-moded equipment installed during or prior to World War II and which can no longer cope with the increased traffic is funded at $.9 million. Nuclear Biological and Chemical warfare Defense equipment is funded at $.7 million. This program replaces ineffective equipment, outdated material and fills established allowances. Miscellaneous Items Under $500,000 are funded at $1.7 million. Included in the FY 1973 request is $.3 million for fleet moorings, $.3 million for public works shop equip-

ment, $.8 million for Ocean Construction Equipment, $.1 million for a refuse compactor, and $.2 million for Naval Reserve Inshore Undersea Warfare equipment.

PASSENGER CARRYING VEHICLES

Chairman ELLENDER. $2.9 million is requested for 852 passenger carrying vehicles. I note that this request also includes metropolitan ambulances for the Navy and the Marine Corps. Please provide a tabulation for the record giving a breakdown of these 852 vehicles by types, such as sedans, station wagons, and ambulances.

Admiral MINTER. I will provide a tabulation for the record.

(The information follows:)

Type:	Quantity
Buses	86
Sedans	518
Station wagons	216
Ambulances	42
Total	852

PASSENGER CARRYING VEHICES

Chairman ELLENDER. During fiscal year 1972, funds were provided for the procurement of only 625 passenger carrying vehicles, and as I indicated, you are requesting 852 for 1973. Just what is the need for this increase in the number of passenger vehicles?

Admiral MINTER. Based on passenger carrying vehicle life expectancy replacement eligibility criteria, an average of 1,160 units within the inventory of 7,663 passenger vehicles wears out annually. In fiscal year 1973, 41 percent or 3,114 units are eligible for replacement. The 852 vehicles requested are below the annual wear-out quantity and are needed to slow down the rapid aging and deterioration of the passenger vehicle inventory.

Senator YOUNG. Am I correct when I assume that all of these 852 vehicles are for the replacement of existing vehicles and do not represent an increase in your overall fleet of vehicles?

Admiral MINTER. Yes, sir.

PROCUREMENT OF TRUCKS

Chairman ELLENDER. $15.1 million is requested for the procurement of 3,215 trucks. Please provide a tabulation for the record setting out the different types of trucks included in your request.

Admiral MINTER. Yes, sir.

(The information follows:)

Type:	Quatity
Utility	140
Pickup	1,424
Van	332
Panel	63
Cargo	55
Dump	165
Stake	441
Truck tractor	74
Tank	42
Refuse	59
Telephone maintenance and construction	192
Miscellaneous	228
Total	3,215

Senator YOUNG. Are these 3,215 trucks for the replacement of existing trucks?

Admiral MINTER. Yes, sir.

TRUCK INCREASE

Chairman ELLENDER. For fiscal year 1971, funds were provided for 1,746 trucks; for fiscal year 1972, funds were provided for only 804 trucks; and as I indicated, you are requesting 3,215 for fiscal year 1973. What accounts for this very large increase in the number of trucks?

Admiral MINTER. The age life expectancy of the mix of trucks in the Navy's inventory of 37,605 units is 6.7 years. An average of 5,600 wears out annually. In fiscal year 1973, 42 percent or 15,606 trucks are eligible for replacement. The 3,215 trucks requested are considerably below the annual wear-out quantity and are needed to partially forestall the further aging and deterioration of the truck inventory. Continued retention of overage equipments will result in further degradation of fleet support by the naval shore activities and impair the operational readiness posture of the naval construction forces.

TRAILERS

Chairman ELLENDER. I note on line 3 you are requesting $400,000 for the procurement of 73 trailers. Comment on the nature of these trailers and your need for these 73 you are requesting, in view of the fact funds were provided for only six trailers in 1971 and nine trailers in 1972.

Admiral MINTER. Requested procurements include stake, low boy, and tank type trailers. This will replace only 27 percent of 188 overage units in naval construction forces inventories and permit the acquisition of 22 units for outfitting 11 Reserve inshore undersea warfare divisions with the minimum equipment for peacetime training. The fiscal year 1971 and 1972 budgets permitted very limited procurements in this category of equipment due to overall funding constraints; increasing the retained overage factor to a critical level.

CONSTRUCTION AND MAINTENANCE EQUIPMENT

Senator YOUNG. $18.1 million was requested for the procurement of various types of construction and maintenance equipment, as set out in lines number 4 through 13 of the P–1 exhibit. Please comment generally on the nature of this equipment.

Admiral MINTER. Construction and maintenance equipment comprises all mechanical equipment used by the naval construction forces for building site preparation, road and airfield construction and by shore activities for the alteration or repair of buildings and other kinds of real property. It includes pile drivers, power shovels and cranes with special attachments, road rollers, tractors, scrapers, plows, street sweepers, sprinkle carts, portable boilers, pumps, air compressors and the like. It also includes such stationary machines and mechanical apparatus as rock-crushing plants, concrete batching and mixing plants, and similar equipment used in construction and public works maintenance.

CRUSH-MIX-BATCH PAVING EQUIPMENT

Chairman ELLENDER. $1.2 million is requested for the procurement of 97 crush-mix-batch-paving equipment. What is your need for this equipment?

Admiral MINTER. Sixty-one percent of 370 units in the inventory of Navy shore activities are overage and eligible for replacement. The requested procurement for shores activities will permit replacement of only 65 wornout units. The other 32 units are required for the naval construction forces and represent only a 31 percent replacement of the overage equipment. This equipment is critical to shore facility maintenance and construction forces operational requirements, being essential to the construction, maintenance and repair of roads, airfields, and building structures.

DRILLING AND BLASTING EQUIPMENT

Senator YOUNG. What is your need for the $1.1 million you are requesting for drilling and blasting equipment? I note that only $0.4 million was provided for this type of equipment in 1971 and only $0.2 million in fiscal year 1972.

Admiral MINTER. Forty-one percent or 331 units in the inventory of Navy shore activities are overage and eligible for replacement. The requested procurement for shore activities will permit replacement of only 50 wornout units. The other 41 units are required for the naval construction force and represent only a 32 percent replacement of the overage assets. Purchases in fiscal years 1971 and 1972 were held to a minimum due to the paucity of funds. This equipment is utilized for well drilling, quarry operations, and foundation preparation.

EARTH MOVING EQUIPMENT

Chairman ELLENDER. $6.4 million is requested for the procurement of 342 pieces of earth moving equipment. Give us two or three examples of the types of equipment that you expect to be procuring with these funds and your need for this equipment.

Admiral MINTER. Some examples of equipment to be procured are road graders, bulldozers, and road rollers. This equipment is needed for the maintenance of grounds, utilities, roads and streets, and for sanitary land fills at shore activities. Similar equipment is used by the naval construction forces for building site preparation, road and airfield construction.

LIGHTING AND POWER GENERATING EQUIPMENT

Senator YOUNG. Give us some examples of the types of equipment you expect to procure with the $1.2 million requested for lighting and power generation equipment.

Admiral MINTER. Some examples of equipment are floodlight sets, arc-welders and portable generator sets of 5 kilowatts through 200 kilowatts capacities.

Miscellaneous Construction Equipment

Chairman Ellender. Give us some examples of the types of equipment included in the $1.9 million for miscellaneous construction and maintenance equipment.

Admiral Minter. The types of equipment are, pumps, steam cleaners, sewer cleaners, insecticide sprayers, power mowers, street and warehouse sweepers, and snow removal equipment.

Firefighting Equipment

Chairman Ellender. What is involved in the $700,000 requested for firefighting equipment?

Admiral Minter. The procurement of 13 replacement structural/brush firetrucks, 12 airfield crash firetrucks and two airfield emergency runway foaming units.

Weighthandling Equipment

Senator Young. Please comment on the request of $3.4 million for weight handling equipment.

Admiral Minter. These funds will be used to procure urgently needed replacement cranes in support of the operating forces construction mission; and for the replacement of overage and obsolete cranes used for handling ammunition and weapons at depots, weapons plants and shipyards, for ships and communication station antenna maintenance, and for facilities maintenance at shore activities.

Initial Repair Parts

Chairman Ellender. I note that you are requesting $900,000 for initial repair parts. As I recall, this item was included in your previous discussion of spares and repair parts. Am I correct about this?

Admiral Minter. Yes, sir.

First Destination Transportation

Senator Young. On line 13 of the P–1 exhibit, there is a request of $1.3 million for first destination transportation. Is this only for the items procured under budget activity 5?

Admiral Minter. Yes, sir.

Amphibious, Specialized, and Combat Construction Equipment

Chairman Ellender. $3.4 million is requested for the category entitled "Amphibious, specialized, and combat construction equipment." How much was provided for the procurement of this type of equipment in fiscal years 1971 and 1972?

Admiral Minter. These line items were funded in the amount of $9.2 million in fiscal year 1971 and $3.7 million in fiscal year 1972.

Chairman Ellender. Give us several examples of the types of equipment you expect to procure with these funds. Is all of this equipment to be used by the Navy's Seabees?

Admiral MINTER. Examples of equipment include: Pontoon structures, causeway lift gear, fabric fuel tanks, fuel systems, and relocatable buildings. All these equipments/assemblies are to be used by the Navy's Seabees.

TELEPHONE EQUIPMENT

Senator YOUNG. Comment on the need for the $900,000 for the procurement of telephone equipment.

Admiral MINTER. These funds are required to mechanize and modernize Navy-owned telephone systems and services at specific locations to provide more efficient and reliable communications. Many Navy-owned telephone systems were installed prior to, or during World War II, and are now outmoded, inefficient, and require costly maintenance and repair.

NUCLEAR, BIOLOGICAL, AND CHEMICAL WARFARE DEFENSE EQUIPMENT

Chairman ELLENDER. Please comment on the need for the $700,000 requested for nuclear, biological, and chemical warfare defense equipment.

Admiral MINTER. The NCB program provides disaster control organizations within the operating forces, overseas activities and strategic CONUS shore activities with essential material for defense against biological and chemical warfare (BW/CW) attack, recovery from BW/CW munition accidents, and personal protection for riot control duties certain of the items are also used for decontamination of nuclear radioactive fallout. Fiscal year 1973 NBC funds will be utilized for the procurement of material to replace expended or outdated items within current assets maintaining the equipment at 22 percent of the authorized inventory objective.

MISCELLANEOUS EQUIPMENT

Senator YOUNG. On page 19 of the P–1 exhibit, I note a request of $1.1 million for mobile utility support equipment. Please comment on this item.

Admiral MINTER. The mobile utilities support equipment or MUSE program provides a source of equipment to meet the following requirements: Temporarily replace or supplement installed utilities equipments which are out of service because of accident, catastrophe or planned maintenance/overhaul action; support of expeditionary military operational requirements; "Cold Iron"—fill emergency short-term requirements in support of military construction—and provide support for unforeseen requirements resulting from emergencies or changes in planning or programing. The MUSE is comprised of various utility equipment types including electric power generating units, steamplants, and substations/transformers.

MILITARY ASSISTANCE SERVICE FUNDED PROGRAMS

Chairman ELLENDER. Comment on the $2 million requested for the military assistance service funded program and give us some examples of the types of items to be procured and the countries involved.

Admiral MINTER. The $2 million requested for the military assistance service funded program will be used to procure items such as trucks, trailers, air compressors, generators, and truck cranes for the Vietnamese Navy.

COLLATERAL EQUIPMENT

Senator YOUNG. Give us several examples of the types of equipment you expect to procure with the $4.1 million requested for collateral equipment.

Admiral MINTER. Some examples of the types of equipment are office furniture and equipment, medical and dental equipment, and classroom equipment.

MISCELLANEOUS ITEMS

Chairman ELLENDER. Give us several examples of the types of items you expect to procure with the $1.7 million request for "Items less than $500,000 each."

Admiral MINTER. Some examples of the types of items are fleet moorings for offshore mooring of vessels; shop equipment, such as lathes, hydraulic presses and metal forming machines; and equipment used in support of underwater construction.

BUDGET ACTIVITY 6—SUPPLY SUPPORT EQUIPMENT

Chairman ELLENDER. The total requested for "Other procurement, Navy," includes $8.4 million for budget activity 6 entitled "Supply Support Equipment." Page 2 of the justification will be included at this point.

(The information follows:)

Budget activity 6: Supply support equipment

[In thousands]

Fiscal year 1973 estimate	$8,400
Fiscal year 1972 estimate	6,599
Fiscal year 1971 actual	6,855

Purpose and Scope of Work

This budget activity finances the procurement of materials handling equipment for all Navy installations, certain self-propelled equipment used aboard ships, automated materials handling systems, miscellaneous support equipment, and certain pollution control equipment.

Justification of Funds

Materials Handling Equipment—$5.2 Million (P–1 line items 1, 3, and 4).—The requested funds cover cyclical replacement of vehicular materials handling equipment ashore and aboard ships. Replacement needs are determined individually for each item of equipment. The objective is to replace equipment when maximum economic life has been reached. Funds are also requested to finance procurement and installation of automated materials/fuel handling systems at certain major supply activities, and handling equipment for commissary stores initial outfitting. These systems consist of powered conveyors, tote boxes, and electronic control mechanisms which direct the movement of material in and around warehouses and storage facilities.

Other Equipment—$3.2 Million (P–1 line items 5 and 6).—The requested funds provide for replacement of support equipment utilized in the operation of the Navy Publications and Printing Service, Naval Supply Centers and Depots, Inventory Control Points, and other activities under the cognizance of the Navy Supply Systems Command. Replacement of equipment is essential to the main-

tenance of production efficiency and the reduction of operation and maintenance costs. Funds are also requested for pollution control equipment for use at Naval activities in the United States to provide protection against oil polluting spills.

POLLUTION CONTROL EQUIPMENT

Chairman ELLENDER. As I recall, the $1.7 million requested for this budget activity for pollution control equipment was discussed in the earlier discussion of the $8.1 million for environmental protection. Am I correct about this?

Admiral MINTER. Yes, sir. That is correct.

FORKLIFT TRUCKS

Chairman ELLENDER. $3.6 million is requested for the procurement of 384 forklift trucks. Are these to replace existing equipment, or do they represent an increase in your overall inventory of this type equipment?

Admiral MINTER. The forklift trucks to be procured in fiscal year 1973 are primarily for replacement of existing overage equipment. However, the request does include procurement of new, non-replacement type equipment for initial outfitting of two Naval Reserve Cargo Handling Battalions. The fiscal year 1973 procurement program will cause no increase in overall inventory for this type equipment.

Chairman ELLENDER. Just what is your requirement for these 384 forklift trucks?

Admiral MINTER. The funds requested will provide for procurement of forklift trucks in various sizes for use in material handling operations at Navy shore activities and aboard ships. The major portion of the fiscal year 1973 procurement program will be used to replace existing equipment which has become uneconomical to retain due to age or condition.

MATERIALS HANDLING EQUIPMENT

Senator YOUNG. $1.6 million is requested for materials handling equipment. What do you intend to procure with these funds?

Admiral MINTER. $1.1 million is requested for procurement of warehouse tractors, warehouse cranes, straddle trucks, pallet trucks, trailers, batteries, and first destination transportation charges; $0.5 million is requested for procurement and installation of automated materials handling systems and automated bulk fuel handling systems at certain Navy shore activities.

SUPPORT EQUIPMENT

Chairman ELLENDER. Please comment on the request of $1.5 million for support equipment.

Admiral MINTER. Investment type equipment costing $1,000 or more per item, is procured with these funds. The $1.5 million will provide for replacement of equipment such as printing presses, collators, and sorters used by the Navy Publications and Printing Service. The request also provides for office and shop equipment such as copiers, envelope sealing machines, hydraulic presses, compactors, bandsaws, lathes, et cetera.

BUDGET ACTIVITY 7—PERSONNEL AND COMMAND SUPPORT EQUIPMENT

Chairman ELLENDER. The request for "Other procurement, Navy," includes $38.6 million for budget activity 7 entitled "Personnel and Command Support Equipment." Pages 2, 3, and 4 of the justifications will be included in the record at this point.

(The information follows:)

Budgt activity 7: Personnel and command support equipment

[In thousands]

Fiscal year 1973 estimate	$38,600
Fiscal year 1972 estimate	31,705
Fiscal year 1971 actual	59,926

Purpose and Scope of Work

This Activity funds the procurement of training aids and devices, scientific and technical equipment, industrial shop equipment, data processing equipment and other general support equipment for headquarters operations and cognizant field activities, operating forces and shore activities of fleet commands, and training activities and schools including the U.S. Navy Academy.

Justification of Funds

Personnel support equipment (P–1 line items 1–10)

[In thousands]

Fiscal year 1973 estimate	$9,600
Fiscal year 1972 estimate	7,205
Fiscal year 1971 actual	8,307

The FY request includes $6.2 million for submarine training. An electromagnetic stimulator ($1.0 million) is required to drive operational equipments to create, in an ashore training situation, the electronic warfare environment of submarines on intelligence gathering missions. A Submarine Attack Center is requested at $5.0 million to provide submarine fire control organizations with team training in all phases of submarine approach and attack. Training aids, devices and spare parts support are funded at $.2 million for such items as sonar target characteristics and computer replacements for Ship Control Trainers.

A request of $1.0 million will support Anti-Submarine warfare training. This request includes $.6 million to incorporate synthetic AN/SQS–35 sonar equipment into the Surface Ship ASW Attack Trainer at Newport and $.4 million for digital sonar maintenance trainers and for modifications to other sonar trainers.

The remaining $2.4 million will provide for other training requirements and general support equipment. This includes $.4 million to support academic programs at the Postgraduate School and Naval Academy with such training aids and equipments as recording spectrophotometers, calculators, education television items, oscilloscopes, dilatometer and precision seismic recorders. In addition, $.7 million will provide for a myriad of training aids, devices such as training films, educational TV equipments, electronic warfare operator trainers, and touch typing systems. Most of the funds for general support equipment ($1.0 million) are to procure equipment for the first phase of an automated microform system to replace the present manually maintained flat paper personnel records of officer and enlisted men of the U.S. Navy and U.S. Naval Reserve. Other items of general support equipment being procured ($.3 million) are dental chairs and units, flexo-writers, hydraulic brake presses, laundry equipments, milling machines, and X-ray film processor.

Command support equipment (P–1 line items 11–16)

[In thousands]

Fiscal year 1973 estimate	$29,000
Fiscal year 1972 estimate	24,500
Fiscal year 1971 actual	51,619

Office of the Chief of Naval Operations $8.8 million (P–1 Line Items 11 and 12).—This request is primarily for the computer acquisition program ($7.9 million) which provides for centralized procurement of automatic data processing equipment for naval activities. In addition $.6 million is requested for equipment to support the Department of Defense "Time and Frequency Management" Program and Star Charting Programs, $.2 million to provide intelligence type equipment to support the Commander-in-Chief, Pacific requirements, and $.1 million to provide miscellaneous equipment for other activities which the Office of the Chief of Naval Operations provides primary support.

Medical Support Equipment $4.9 million (P–1 Line Item 13).—Acquisition of Medical Facilities Equipment at a cost of $4.6 continues as the major expense element for the Bureau of Medicine and Surgery. In FY 73, a special program of $2.1 million is planned for replacement of X-ray equipment. Coronary care units, intensive care units, laboratory equipment, surgical equipment, and column control ventilators are other primary items within the remaining $2.5 million for Medical Facilities Equipment. The remaining funds include $.2 million for the acquisition of a limited amount of television equipment which is required to provide closed circuit monitoring and care of critically ill patients, and $.1 million to complete the dental equipment replacement program.

Oceanographic Command Support Equipment $2.7 million (P–1 Line Item 14).—This request provides for the procurement of scientific and technical and related equipment, industrial shop, photographic, printing and survey equipment essential to accomplish the mission of the Oceanographer of the Navy for the Mapping, Charting and Geodesy and the Oceanography programs. The FY 73 request of $1.2 million under Mapping, Charting and Geodesy provides equipment for support of Hydrographic/Bathymetric Surveys, Geophysical Surveys, and modification of Sponsor equipment and spaces in Military Sealift Command manned ships. The request for $1.5 million for Oceanography provides equipment for support of Oceanography Programs ashore associated with Administration, Engineering and Laboratories. Included is equipment for ASW/USW and CAESAR Surveys, AGOR ship operations, and related modification of sponsor equipment and spaces in Military Sealift Command manned ships.

Intelligence Command Support Equipment $7.4 million (P–1 Line Item 15).—Funds requested for FY 1973 will provide items of support equipment required by the Naval Intelligence Command and its field activities in such intelligence program areas as Technical Sensor collection effort, Scientific and Technical Intelligence, Counterintelligence and Investigative activities, Intelligence Data Handling System, Technical Intelligence Fleet Support, and Imagery.

Operating Forces Support Equipment $5.3 million (P–1 Line Item 16).—Funds requested for FY 1973 will provide for procurement of general support equipment required by shore activities and forces afloat under command of fleet claimants and for administrative type equipment for organizations whose requirements are not otherwise provided within the appropriation structure. Organizations funded include Commander-in-Chiefs, U.S. Atlantic and Pacific Fleets, Commander-in-Chief, U.S. Naval Forces Europe, Chief of Naval Air Training, Commanders of Naval Reserve Training, Naval Security Group, and Naval Communications Commands, and the Office of Navy Comptroller and Secretary of the Navy Staff Offices.

Chairman ELLENDER. Of the $38.6 million requested for this budget activity, $9.6 million is for personnel support equipment, as set out in P–1 line Nos. 1 through 10. Those items in lines No. 2, 3, 5, and 9, totaling $6.7 million, were all discussed earlier. Am I correct about this?

Admiral MINTER. Yes, sir; that is correct. Those items were discussed during the course of my opening statement.

RAPID RETRIEVAL MICROFORM SYSTEM

Senator YOUNG. Please comment on the request of $1 million set out on line 8 of the P–1 exhibit for the rapid retrieval microform system.

Admiral MINTER. Mr. Chairman, the amount requested will permit us to procure equipment for the first phase of an automated microform

system to replace the present manually maintained flat paper personnel records of officer and enlisted personnel that are currently being maintained at the Bureau of Naval Personnel. The purpose of this item is to improve access to personnel records and to eliminate the need for retaining millions of paper documents in file cabinets with the attendant costs of space, maintenance and delivery. The first phase of the program will permit automation of officer records. Enlisted personnel records will be converted as phase 2 of the program.

Miscellaneous Items

Senator Young. On line 10 of the P–1 exhibit, there is a request of $1.9 million for "Items of less than $500,000." Give us several examples of the types of items you expect to procure with these funds.

Admiral Minter. The types of items procured in this line item fall within three broad categories of equipments. Namely, these are training aids, devices and equipment, commercial scientific equipment, and general support equipment. The first category covers those items, of relatively minor costs per unit, that are used throughout the Navy by the various schools and aboard ships to provide training to operating as well as weapons systems maintenance personnel. Examples are sonar target characteristics trainers, high speed diving trainers, digital sonar maintenance trainers, and electronic warfare operator trainers.

Commercial scientific equipment includes such items as spectrometers, centrifuges, spectrophotometers, analyzers, recorders and test equipment to support academic programs at the postgraduate school and Naval Academy.

Items of general support equipment include dental chairs and units, Flexowriters, laundry equipments, industrial-type shop equipment, and administrative-type items such as duplicators and magnetic tape typewriters.

Command Support Equipment

Chairman Ellender. The balance of the request, $29 million, for this budget activity is for the category entitled "Command support equipment." How much was provided for the procurement of this type of equipment in fiscal years 1971 and 1972?

Admiral Minter. Sir, in fiscal year 1971 we were provided $51.6 million and in fiscal year 1972 it was $24.5 million.

Office of the Chief of Naval Personnel

Chairman Ellender. $8.7 million is requested for the procurement of equipment for the support of certain operations under the Office of Chief of Naval Operations. Please comment on this request.

Admiral Minter. Yes, sir. As a part of our continuing efforts to improve management of the Navy's automatic data processing program, in fiscal year 1971 we initiated a procurement program to purchase computers that were then being leased at a somewhat uneconomical cost compared to out right purchase of the equipment. Further management improvements since then have included centralization for the Navy-wide budgeting and procurement of business-type computer equipment under the Information System Division of the Office of the

Chief of Naval Operations; $7.9 million of the $8.7 million in our request relates to this action and provides for the procurement of ADP equipment for the worldwide command and control system and at various naval activities worldwide. The balance of $0.8 million will support equipment procurement for the Naval Observatory and for other activities which the Office of Chief of Naval Operations provides primary support.

MEDICAL SUPPORT EQUIPMENT

Senator YOUNG. On line 13 of the P–1 exhibit, there is a request of $4.9 million for the procurement of medical support equipment. Please comment on the nature of the equipment to be procured with these funds and the requirement for this type of equipment.

Admiral MINTER. Mr. Chairman, the funds provided are for the diagnostic and treatment support equipment for naval medical centers, hospitals, and other medical activities under the command of the Surgeon General. They are needed to replace obsolete or worn-out equipment items of which the major areas are: X-ray equipment, laboratory equipment, coronary care and intensive care units, and ancillary support service equipment.

OCEANOGRAPHIC EQUIPMENT

Chairman ELLENDER. Please comment on the request of $2.7 million for the procurement of oceanographic equipment.

Admiral MINTER. This request provides for the procurement of scientific and technical and related equipment, industrial shop, photographic, printing, and survey equipment essential to accomplish the mission of the Oceanographer of the Navy for the mapping, charting, and geodesy and the oceanography programs. These items are required to support hydrographic/bathymetric surveys, geophysical surveys, certain equipments used for operations abroad Military Sealift Command manned ships engaged for surveys by the Oceanographer and for support of administration, engineering, and laboratories in oceanography programs ashore.

INTELLIGENCE EQUIPMENT

Chairman ELLENDER. Please comment on the request for $7.4 million for the procurement of intelligence support equipment, and explain why you need an increase of $1.6 million for the procurement of this type of equipment.

Admiral MINTER. Mr. Chairman, these funds provide items of support equipment required by the Naval Intelligence Command and its field activities in such intelligence program areas as technical sensor collection effort, scientific and technical intelligence, counterintelligence and investigative activities, intelligence data handling system, technical intelligence command support, and imagery.

The $1.6 million increase over the amount provided in fiscal year 1972 is required to provide replacement as well as more sophisticated equipment items in the aforementioned areas of intelligence. There are many individual programs underway in these areas and in some cases the phasing of prior planned increased efforts dictate providing

additional equipment funding support to meet these established milestones. Specifically, the increase can be found in requirements for technical sensor collection in connection with our underseas warfare collection efforts.

OPERATING FORCES EQUIPMENT

Senator YOUNG. Just what is involved in the request of $5.3 million for the procurement of operating forces support equipment?

Admiral MINTER. Mr. Chairman, as you may recall beginning with fiscal year 1968 the Navy realined management and fund flow to coincide with command channels. This meant that the operating forces and shore activities within the geographical area of a particular command in chief were removed from under control of the technical bureaus and systems commands and placed under his management and funding control.

These forces and activities had previously received general purpose equipment funding support from their respective management organizations. In order to provide for such funding support within the other procurement, Navy appropriation of the line item for operating forces support equipment was created. This line item supports the procurement of equipment requirements for these forces and activities that are not otherwise provided as technical equipment under other budget activities of the appropriation. The types of equipment involved include administrative and office type equipment, medical and dental equipment for dispensaries and clinics under command of the fleets, industrial type machinery and equipment for the afloat tenders, ship repair facilities and naval stations, general purpose equipment for public works and aircraft maintenance departments, and a myriad of other equipment items costing in excess of $1,000 each and required for the operations of a particular activity under fleet command.

SUPPORT OF FREE WORLD FORCES

Chairman ELLENDER. How much of the total requested for "Other procurement, Navy," is for the support of free world forces, what countries are involved, and give us the amounts for each country.

Admiral MINTER. Of the total requested for other procurement, Navy, $5.3 million is earmarked for support of free world forces. This entire amount will be expended for Vietnam.

Chairman ELLENDER. Please provide a P–1 type tabulation identifying each of the items in the total for the support of free world forces.

Admiral MINTER. Yes, sir.

(The information follows:)

[Millions of dollars]

B.A.1—Line item 80: Small boats—Military assistance service funded (MASF)	.1
B.A.2—Line item 72: Communications and electronics equipment—MASF	.2
B.A.4—Line item 9: Ordnance support equipment—MASF	3.0
B.A.5—Line item 21: Civil engineering support equipment—MASF	2.0
Total	5.3

QUESTIONS BY SENATOR THURMOND

Chairman ELLENDER. Senator Thurmond was unable to be here today but has asked that responses to questions he has supplied will be answered for the record. The questions and answers will appear at this point in the record.

(The information follows:)

PHALANX WEAPONS SYSTEMS

Senator THURMOND. Admiral Minter, in your statement you indicate the Navy wishes funds this year to begin procurement of PHALANX Weapon Systems for close-in ship defense. The Navy is requesting a buy of 9 in FY 1973. Is it safe to buy these this year when about 25% in research and development of the total PHALANX program is also scheduled in FY 1973?

Admiral MINTER. Because of the urgency in providing the Fleet with a hard kill defense against the large, high speed, low flying anti-ship cruise missile, the PHALANX Close-In Weapon System program is being pursued on an accelerated basis. Initiating the first increment of a [deleted] unit pilot line procurement prior to completing all development and testing does incur some risk. However basic design of the system has been completed and tests already performed and to be further verified prior to FY 1973 using an engineering model in a functionally complete configuration will provide high confidence that production may be safely initiated. [Deleted] from production start-up until delivery of the first of 9 units [deleted], two prototype systems will also have been fabricated and subjected to extensive shore and at sea testing and evaluation. Lessons learned from these tests will be incorporated before the production units are delivered and installed in the Fleet.

Senator THURMOND. What weapon systems will the PHALANX replace?

Admiral MINTER. PHALANX CIWS is a complementary part of the Defense in depth concept and, as such, does not replace any existing weapon system. It is the function of PHALANX to provide an essentially continuous—alert automatic, fast reacting, all weather inner-zone defense capability which is currently lacking in the fleet. As a practical matter, since most ships are space and weight critical, obsolete or less effective systems may have to be removed before PHALANX can be installed on some ships. Typical weapon systems that may be removed in preference to PHALANX would include 5-and 3-inch guns.

Senator THURMOND. On what type of ship does the Navy plan to place the [deleted] systems in the total buy?

Admiral MINTER. Phalanx systems are currently planned for use aboard a variety of ships with high value combatants having first priority. We have not yet determined what the total buy will be. Ship types being considered for installation of CIWS will be provided for the record.

(Information follows:)

CVA, CVAN, CLG, CG, CGN, DLG, DLGN, DD, DDG, DE, DEG, LCC, LPD, LPH, LHA, LKA, LST, AD, AE, AF, AO, AOE, AOG, AOR, and AR.

[Deleted] systems are planned for procurement under the SCN appropriation and installation aboard new construction ships. Types of ships involved in this planning include: DD, LCC, LHA, AOE, AOR, and CVAN.

OTHER DEFENSE SYSTEMS

Senator THURMOND. This system has been called a "last ditch" defense for our ships. What other weapons systems would the enemies' aircraft and missiles be faced with before this "last ditch" weapon would come into play?

Admiral MINTER. In the case of the large carrier task force, an enemy's aircraft and missiles would first encounter Navy fighter aircraft at the outer zone [deleted] into the area covered by surface-to-air missiles. SAMS [deleted] provide area defense into ranges of a few miles. Point defense missile systems provide limited close-in area defense and self-defense capability [deleted]. The presence of Phalanx would greatly enhance the fleet defenses by compensating for leakage

of targets past other defenses and by providing repeat attacks against target which may survive longer range defenses.

In the case of the isolated surface combatant, logistic support ship, etc., Phalanx CIWS may be the only defensive system to come into play against antiship cruise missile.

OTTO FUEL

Senator THURMOND. Admiral Minter, does the Navy plan to change the OTTO fuel which complicates the maintenance problems on tenders and shore-based preparation areas as well as on-board submarines? Personnel must be provided special breathing masks and protective clothing, increased ventilation of affected areas is required, and special disposal methods are necessary.

Admiral MINTER. A new fuel [deleted] is currently under evaluation as possible replacement for OTTO fuel. This fuel is much less toxic than OTTO fuel.

Senator THURMOND. Would the development of a new type fuel impact on the cost of delivery schedule of the Mark 48 torpedo?

Admiral MINTER. If the [deleted] fuel is found to be satisfactory, we are cautiously optimistic that cost or timing impact will be negligible.

NOISE REDUCTION EFFORT ON MARK 48 TORPEDO

Senator THURMOND. How long will the noise reduction research effort on the Mark 48 torpedo continue?

Admiral MINTER. The noise reduction research effort is planned to be completed in fiscal year 1974. However, noise reduction efforts will continue until radiated noise has been reduced to specification or we are convinced that the results achieved are sufficient to deal with projected submarine target capability, insuring that radiated noise does not become a limiting characteristic in the future.

BACKFITTING OF COMPONENTS

Senator THURMOND. Will torpedoes in the current and past buys be backfitted with any components if the noise reduction problem can be improved?

Admiral MINTER. Ideally we would like to backfit all torpedoes to maintain one torpedo configuration. In some cases it may not be economically feasible to do that. Therefore, we will examine each change and evaluate its effectiveness against the costs involved in backfit, including the logistical costs involved in supporting different configurations in the fleet.

MARK 48 SCHEDULE

Senator THURMOND. Admiral, when will the first Mark 48 be placed aboard our attack submarines for fleet deployment?

Admiral MINTER. Initial deployment occurred on February 27, 1972, in U.S.S. *Bergall* (SSN 667) in the Atlantic Fleet. By the end of calendar year 1972 [deleted] additional submarines will be outfitted. It is expected that the number will grow to [deleted] additional submarines per year in calendar years 1973 and 1974.

Senator THURMOND. How long will it take to get reasonable numbers in the fleet to the extent that our deficiency in this area will be significantly reduced?

Admiral MINTER. Our plans call for having a shipfill for all Mark 48 capable submarines in [deleted].

USED MARK 48 TORPEDO ON SURFACE SHIPS

Senator THURMOND. Does the Navy plan to place any Mark 48 torpedoes on surface ships?

Admiral MINTER. There are no definitive program plans to place Mark 48 torpedoes on surface ships, although space and weight reservations exist on certain classes of ships in the event the Navy decides to exercise the option. The Navy is currently evaluating the Mark 48 torpedo for possible employment on the DE–1052 class destroyer escort. Present Navy plans are based on approved objectives which at this time do not include the requirement for installation of the Mark 48 torpedo system on surface ships.

Mark 48 Torpedo Specifications

Senator Thurmond. Has the Mark 48 torpedo selected by the Navy between the two competing contractors fully met Navy specifications?

Admiral Minter. Yes; except for a specification for radiated noise. The effect of this on ASW operations has been found to be of rather minor significance in the expected encounter situations. An aggressive program is in effect to develop noise reduction improvements which can be later backfitted and included in later procurements.

MOD–O Torpedoes

Senator Thurmond. What does the Navy plan to do with the MOD–O torpedoes which were bought from the losing contractor before a final decision was made in the competition last year?

Admiral Minter. Under the project office we control their use in both basic torpedo research and the testing of new applications and technology. These are all prototype torpedoes from the lot procured for evaluation. There were no deliveries made from the follow-on pilot production contract which was terminated.

Westinghouse Contract

Senator Thurmond. How much money was saved by termination of the Westinghouse contract? What has been done with those funds?

Admiral Minter. Of the $37.4 million definitized price of the pilot production contract with Westinghouse, $7.2 million was recovered at termination on July 2, 1971. In December 1971, an additional $1.2 million was found to be in excess of Westinghouse expenditures and was recovered. These funds recovered to date total $8.4 million. In addition, $9.2 million set aside for later negotiation for spares and logistic support was recovered at termination for a total of $17.6 million. As was planned, these funds have been applied to the contract with the selected contractor for procurement of torpedoes.

Initial Spares Funding

Senator Thurmond. What is the basis for the initial spares funding requests on the Mark 48?

Admiral Minter. Initial spares funding is based upon the need for spares to support the operation of intermediate level maintenance sites to be activated. Spares will have been procured during the previous fiscal year funding for the initial outfitting of nine intermediate shops both afloat and ashore. This year we will be expanding these nine shops and initially outfitting seven additional shops. Enough consumables are planned for exercise firings and the requisite warshot periodic maintenance in the fiscal year 1973 support time period.

Subcommittee Recess

Chairman Ellender. The subcommittee is recessed until 10 o'clock tomorrow morning.

(Whereupon, at 4:30 p.m. Wednesday, March 1, the subcommittee was recessed, to reconvene at 10 a.m. Thursday, March 2.)

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1973

THURSDAY, MARCH 2, 1972

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee met at 10:15 a.m., in room S-126, the Capitol, Hon. Allen J. Ellender (chairman) presiding.

Present: Senators Ellender and Young.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE NAVY

PROCUREMENT OF AIRCRAFT AND MISSILES, NAVY

STATEMENT OF VICE ADM. M. F. WEISNER, USN, DEPUTY CHIEF OF NAVAL OPERATIONS (AIR WARFARE)

ACCOMPANIED BY:

REAR ADM. S. H. MOORE, USN, DIRECTOR OF BUDGET AND REPORTS, OFFICE OF THE NAVY COMPTROLLER

MAJ. GEN. H. S. HILL, USMC, ASSISTANT DEPUTY CHIEF OF NAVAL OPERATIONS (MARINE AVIATION)

REAR ADM. T. R. McCLELLAN, USN, COMMANDER, NAVAL AIR SYSTEMS COMMAND

REAR ADM. D. C. DAVIS, USN, DIRECTOR, AVIATION PLANS AND REQUIREMENTS DIVISION, OPNAV

REAR ADM. E. L. FEIGHTNER, USN, DIRECTOR, LOGISTICS AND FLEET SUPPORT, NAVAIR

REAR ADM. L. A. SNEAD, USN, F-14/PHOENIX PROJECT MANAGER, NAVAIR

CAPT. W. A. SCHROEDER, USN, SPECIAL ASSISTANT FOR FINANCIAL MANAGEMENT, NAVAIR

CAPT. S. O. SCHWARTZ, USN, HEAD, PAMN AND LEGISLATIVE AFFAIRS, DCNO (AIR WARFARE)

CAPT. R. C. MANDEVILLE, USN, A-6 PROJECT MANAGER, NAVAIR

CAPT. E. M. CROW, USN, A–7 PROJECT MANAGER, NAVAIR
CAPT. F. H. BAUGHMAN, USN, S–3A PROJECT MANAGER, NAVAIR
CAPT. S. R. CHESSMAN, USN, VAST PROJECT MANAGER, NAVAIR
CAPT. J. T. TIMIDAISKI, USN, SPARROW PROJECT MANAGER, NAVAIR
CAPT. R. SCHULTE, USN, SIDEWINDER PROJECT MANAGER, NAVAIR
CAPT. T. D. QUINN, USN, E–2/C–2/ATDS PROJECT MANAGER, NAVAIR
COMDR. A. A. GALLOTTA, USN, EA–6B PROGRAM COORDINATOR, OPNAV
LT. COL. R. C. MARSH, USMC, AV–8A PROJECT MANAGER, NAVAIR
COMDR. K. H. WOODBURY, USN, CONDOR PROJECT MANAGER, NAVAIR
LT. COL. J. R. BRADDON, USMC, WEAPONS SYSTEM PROGRAM COORDINATOR, HQMC
COMDR. M. T. GRADY, USN, AIRBORNE EW COORDINATOR, OPNAV
B. H. KAHN, STRATEGIC SYSTEMS PROJECT OFFICE
E. F. SPECK, OFFICE OF THE NAVY COMPTROLLER
A. L. ITTEILAG, NAVAL AIR SYSTEMS COMMAND

BUDGET REQUEST

Chairman ELLENDER. The subcommittee will please come to order.

The next appropriation to be considered will be "Procurement of Aircraft and Missiles, Navy."

The fiscal year 1973 budget estimate is $3,871,200,000. The amount appropriated for fiscal year 1972 was $3.855 billion.

PROGRAM AND FINANCING

Chairman ELLENDER. At this point in the record there will appear certain program and financing information from the justifications.

(The information follows:)

DEPARTMENT OF DEFENSE—MILITARY PROCUREMENT OF AIRCRAFT AND MISSILES, NAVY, PROGRAM AND FINANCING (IN THOUSANDS OF DOLLARS)

	Budget plan (amounts for procurement actions programed)			Obligations		
	1971 actual	1972 estimate	1973 estimate	1971 actual	1972 estimate	1973 estimate
Program by activities:						
Direct:						
1. Combat aircraft	1,382,462	2,063,976	1,974,800	1,403,525	1,924,300	1,901,300
2. Airlift aircraft		29,300	23,500	830	22,400	23,100
3. Trainer aircraft	140,841	57,350	31,300	130,799	61,000	44,000
4. Other aircraft			31,500	4,571	500	24,600
5. Modification of aircraft	296,586	435,770	359,200	285,331	421,000	366,500
6. Aircraft spares and repair parts	448,542	482,281	460,400	439,517	468,300	458,600
7. Aircraft support equipment and facilities	212,905	196,700	220,900	175,042	184,000	221,500
8. Ballistic missiles	506,166	363,169	346,200	456,772	409,000	351,000
9. Other missiles	294,198	269,155	331,900	252,857	302,000	328,500
10. Modification of missiles	27,385	20,475	26,200	14,205	24,000	25,800
11. Missile spares and repair parts	21,924	31,186	18,600	8,030	28,000	29,600
12. Missile support equipment and facilities	12,055	15,638	46,700	12,965	14,100	46,500
Total, direct	3,343,064	3,965,000	3,871,200	3,184,444	3,858,600	3,821,000
Reimbursable (total)	52,366	37,000	47,000	36,283	40,008	41,000
Total	3,395,430	4,002,000	3,918,200	3,220,727	3,898,608	6,862,000
Financing:						
Receipts and reimbursements from:						
Federal funds	−25,239	−29,000	−29,000	−17,587	−29,000	−29,000
Trust funds	−18,985	−16,000	−16,000	−42,257	−16,000	−16,000
Non-Federal sources[1]	−30,132	−2,000	−2,000	−12,017	−2,.00	−2,000
Unobligated balance available, start of year:						
For completion of prior year budget plans				−1,113,605	−1,123,608	−1,152,000
Available to finance new budget plans	−30,550			−30,550		
Reprograming from (−) or to prior year budget plans	−162,205	−75,000				
Unobligated balance transferred from other accounts	−100,000	−100,000		−100,000	−100,000	
Unobligated balance transferred to other accounts		75,000			75,000	
Unobligated balance available, end of year for completion of prior year budget plans				1,123,608	1,152,000	1,208,200
Budget authority	3,028,319	3,855,000	3,871,200	3,028,319	3,855,000	3,871,200
Budget authority:						
Appropriation	3,017,900	3,855,000	3,871,200	3,017,900	3,855,000	3,871,200
Transferred to other accounts	−6,832			−6,832		
Transferred from other accounts	17,251			17,251		
Appropriation (adjusted)	3,028,319	3,855,000	3,871,200	3,028,319	3,855,000	3,871,200

[1] Reimbursements are derived principally from cash sales to foreign governments (22 U.S.C 2315).

INTRODUCTION OF ASSOCIATES

Chairman ELLENDER. The principal witness for this appropriation is Vice Adm. Maurice F. Weisner, Deputy Chief of Naval Operations for Air Warfare.

Admiral, you may proceed.

Admiral WEISNER. Thank you, sir.

Mr. Chairman and members of the committee: I welcome the opportunity to present to you the Navy's aircraft and missile procurement request.

To assist me are: Rear Admiral McClellan, Commander, Naval Air Systems Command; Major General Hill, Marine Corps Deputy Chief of Staff for Air; Rear Admiral Smith, Director, Strategic Systems Project Office; and Rear Admiral Woods, Commander, Naval Ordnance Systems Command.

ORDERLY UPGRADING OF NAVAL AVIATION TEMPERED WITH FISCAL RESTRAINTS AND PRIORITIES

Our fiscal year 1973 request contains procurement of the modern weapon systems that will provide for an orderly upgrading of naval aviation; however, fiscal constraints and other priorities within naval aviation dictate low procurement quantities in some programs that are barely sufficient to maintain currently approved force levels.

We are building toward the future—toward the capabilities that will be required in the late 1970's time frame.

The aircraft and missile procurement programs contained in our fiscal year 1973 request are all consistent with this objective, and represent an incremental step toward our ultimate force level objectives; however, force modernization in some of our programs is tediously slow.

AIRCRAFT PROCUREMENT

1972 AND 1973 AIRCRAFT AGE AND INVENTIONS

Our active aircraft inventory at the end of fiscal year 1972 will be 7,116. At the end of fiscal year 1973 it will be 6,954. This represents a decrease of 162 aircraft.

As the inventory of all types of aircraft continues to drop, average age continues to climb. Between now and fiscal year 1977 the average age of our inventory will climb from 7.5 to over 10 years.

F–4B AND A–6A AIRCRAFT LIFE EXTENSION

To ameliorate this trend of increasing age and declining inventory, we have instigated service life extension programs (SLEP), and modernization programs in order to extend the useful life of older F–4B aircraft and to update A–6A capabilities to meet current requirements.

AIRCRAFT PER-YEAR PROCUREMENTS

Aircraft procurement averaged 754 aircraft per year in fiscal years 1958 through 1967 and drops to [deleted] per year for fiscal years 1968 through 1977. In the preceding 3-year period, fiscal years 1970, 1971, 1972, we have averaged less than 300 aircraft per year.

Our fiscal year 1973 budget request unfortunately continues this trend with 282 aircraft requested.

Mr. Chairman, with your permission, I will review each program requested this year, concentrating on how it fits into our force level requirements. I will discuss where we stand with respect to equipping the force and why these quantities are requested.

I will show a picture of the aircraft and corresponding data. The data sheets will be provided the recorder for the record.

COMBAT AIRCRAFT

A–6E INTRUDER AIRCRAFT

Chairman ELLENDER. The aircraft data sheet on the A–6E intruder aircraft will be inserted in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—AIRCRAFT DATA SHEET

Service: Navy—Nomenclature: A–6E, P–1 Line Item No. 2, 3; Popular Name: Intruder.

Description/Mission: The A–6E is a long range, carrier and land-based attack aircraft utilized by the Navy and Marine Corps for weapons delivery under all weather conditions and at night. It can also fulfill pathfinder or strike leader functions for visual attack planes when required. It has a moving target indicator system and uses two J–52–P8B engines. The "E" model incorporates a digital computer, a solid state weapons release system and a singly integrated track and search radar for greater system reliability and maintainability than demonstrated by the predecessor A–6A.

The A–6E mission is destruction of fixed and moving sea or land targets, especially at low level, and direct support of ground operations.

COST DATA

[In millions of dollars]

	Fiscal year								Cost to complete	Current estimated total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity	12	12	12	12	[Deleted]	[Deleted]	[Deleted]	[Delhted]	[Deleted]	[Deleted]
Cost	88.3	113.0	93.2	100.3	103.2	112.2	107.0	112.8	517.0	1,347.0
Less advanced procurement, prior year	−5.2	−2.4	−3.8	−3.7	−1.7	−1.8	−1.8	−1.9	−11.9	−34.2
Net current year program	83.1	110.6	89.4	96.6	101.5	110.4	105.2	110.9	505.1	1,312.8
Plus advanced procurement, current year	+7.6	+3.8	+3.7	+1.7	+1.8	+1.8	+1.9	+4.8	+7.1	+34.2
Procurement, unit cost	7.4	9.4	7.8	8.4	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]
Weapon system cost	90.7	114.4	93.1	98.3	103.3	112.2	107.1	115.7	512.2	1,347.0
Initial spares	14.6	11.8	11.4	8.9	11.2	9.8	10.2	10.6	63.0	151.5
R.D.T. & E										
Milcon										
Program acquisition cost	105.3	126.2	104.5	107.2	114.5	122.0	117.3	126.3	575.2	1,498.5
Program unit cost										[Deleted]
Total additional cost										

Basis for fiscal year 1973 budget request: The fiscal year 1973 request of 12 A-6E aircraft continues a modest inventory modernization program and provides a continued new production capability for A-6 type aircraft. These A-6E's are required to replace older A-6A's which are approaching the end of their service life and are inferior to A-6E's in terms of reliability and maintainability.

Test data:

1st flight (new computer and weapons release system).	November 1970.
NPE (Navy preliminary evaluation)	March/April 1971.
1st flight of production aircraft	July 1971.
BIS (Board of Inspection and Survey) trials.	October 1971/January 1972.

Note.—The test program for the A-6E avionics system has been successful and is on schedule. Board of Inspection and Survey (BIS) trials are in the last stages and have revealed no major discrepancies.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	Grumman Aerospace Corp	Firm fixed price.
Engine	United Aircraft Corp., Pratt & Whitney Division	Fixed price incentive, successive target.

	Classification	Requirement	Demonstrated
Performance:			
Speed, combat	U	502 knots/5,000 ft	502 knots/5,000 ft.
Radius, combat	U	383 nautical miles/2.091 hrs	383 nautical miles/2.091 hrs.
Ceiling, combat	U	37,500 ft	37,500 ft.
Maximum takeoff weight	U	52,520 lbs	52,520 lbs.
Ordnance	U	30 MK 81 Snakeyes	30 MK 81 Snakeyes.
Characteristics:			
Crew	U		2.
Length/wing span	U		54 ft. 7 in./53 ft. 0 in.
Engines, number/design	U		2/J52-P-8B.

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	60	$574.6
R.D.T. & E.		
Milcon		
Total program costs	60	574.6
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	[Deleted]	1,495.3
R.D.T. & E.		
Milcon		
Total program costs		1,495.3
Current estimate total program (fiscal year 1973 budget submission):		
Procurement		1,498.5
R.D.T. & E.		
Milcon		
Total program costs		1,498.5

Note.—Difference between fiscal year 1972 and fiscal year 1973 submissions: The current cost for [deleted] A-6E aircraft is $3,200,000 higher than in fiscal year 1972, reflecting projected increased costs of avionics equipments in fiscal years 1978-80.

A-6 CAPABILITIES

Admiral WEISNER. The A-6 is the Navy and Marine Corps only true all-weather attack aircraft. The A-6E is an improved version of the combat-proven A-6A which has demonstrated its capabilities under the most demanding conditions.

This long-range, versatile, twin-jet aircraft is capable of very accurate navigation and weapons delivery and its specialized electronics equipment permits it to attack targets day and night under all weather conditions.

TESTING AND OPERATIONAL EVALUATION

The test program for the A–6E avionics system, featuring a new microminiaturization computer, a solid state weapons release system and a integrated track and search radar, has been successful and is on schedule. Navy preliminary evaluation (NPE) is complete, and the Board of Inspection and Survey (BIS) trials are essentialy complete. A preliminary report of BIS is expected within 1 month. An operational evaluation (Opeval) has been underway since December 1.

All data from these tests indicate a significant improvement in reliability over our A–6A avionics. Our force level requirement is for [deleted] squadrons of A–6 aircraft—[deleted] Navy and [deleted] Marine—in fiscal year [deleted].

PLANNED PROGRAM AND 1973 FUNDING

A total procurement of [deleted] A–6E's is planned, with 36 funded in fiscal year 1972 and prior, 12 in fiscal year 1973, and [deleted] planned for future years.

Additionally, we will retrofit [deleted] A–6E's to the "E" version. I will describe this program in further detail when I discuss our modification programs.

Overall budget constraints and other aviation priorities will permit us to request only 12 A–6E's this year. This request, for 12 aircraft and $98.3 million, continues a modest inventory modernization program and provides for a continued production capability. Required funds for initial spares associated with these aircraft is an additional $8.9 million.

PRESENT INVENTORY

Chairman ELLENDER. How long has that plane been in the inventory?

Admiral WEISNER. We have had the A–6 since approximately 1964.

Chairman ELLENDER. How many of those do you now have?

Admiral WEISNER. The total number of A–6's that we have right now is [deleted].

Chairman ELLENDER. You say you are limited to 12 because of the budget?

Admiral WEISNER. It was a question of priorities, Mr. Chairman.

Chairman ELLENDER. Within the Navy?

Admiral WEISNER. Within the Navy; yes, sir.

IMPROVEMENT OVER A–6A AIRCRAFT

Senator YOUNG. How much of an improvement is the new version over the older one?

Admiral WEISNER. We think the A–6E is a considerable improvement, Senator Young, especially in reliability and maintainability, and improvement in the radar. We think it is a great improvement over the old A–6A's.

Senator YOUNG. Does it have any more speed or maneuverability?

Admiral WEISNER. No, sir; the basic characteristics are essentially the same as far as range, ceiling and speed are concerned. The weapons system, Senator, is what is greatly improved over the older system.

RETROFIT OF A–6A AIRCRAFT TO A–6E AIRCRAFT AND MODERNIZATION COST

Chairman ELLENDER. Can the improvements made on this aircraft be incorporated in the ones you now have in stock?

Admiral WEISNER. Yes, sir. We plan, Mr. Chairman, to retrofit approximately [deleted] A–6A's to the "E" version. That is planned right now.

Chairman ELLENDER. Have you requested funds for that purpose?

Admiral WEISNER. Yes, sir; we are requesting the money for that purpose.

Chairman ELLENDER. How much will these improvements cost?

Admiral WEISNER. For modifications.

Commander GALLOTTA. It is going to average about $1,350,000 per copy, Senator. It will be a little more expensive in the first year of a 4-year program and less expenive in the later years.

Chairman ELLENDER. How does the cost of the A–6E compare to the cost of the A–6A?

Commander GALLOTTA. On new procurement of aircraft, the A–6E cost only $230,000 more than the A–6A when you procure it as a new production aircraft. It is simply up to date avionic equipment. The retrofit will cost a little more.

Chairman ELLENDER. Proceed.

(Data Slide)

WEAPONS SYSTEM AND INITIAL SPARES

Admiral WEISNER. I invite your attention to the data slide. The format has been arranged to coincide with the congressional data sheets provided to you by the Secretary of Defense. Total PAMN dollars include the weapons system cost and initial spares.

Weapons system cost is the actual amount we are requesting under the line item and is derived from flyaway, support requirements, and advance procurement. I would like to emphasize that only the flyaway and prior year advance procurement are directly related to this year's requested quantity.

Advance procurement current year provides long-lead funding for next year's planned request.

Total initial spares requirements are contained in the request for aircraft spares and repair parts but have been included here to provide you with the dollar amounts associated with each weapon system. A portion of support equipment and initial spares will outfit support ships and air stations, independent of the quantity of aircraft in this year's buy.

I point this out to show you that even if zero quantity of any given aircraft is procured this year, a portion of initial spares and support equipment for that aircraft would still be required.

FLYAWAY AND TOTAL PROGRAM UNIT COSTS DIFFERENTIATION

The flyaway unit cost is the cost of one completely equipped aircraft at the head of the runway ready for takeoff. This should be differentiated from total program unit cost which is the cost of single aircraft after prorating the cost of R.D.T. & E., support and initial spares throughout the total program.

Under program status the total actual inventory for this aircraft series as of January 1, 1972, is shown. The title funded and undelivered pertains to the aircraft in this series approved by the Congress for procurement but not delivered to the Navy as of January 1.

Costs through budget year indicates total accumulated PAMN costs for the program through this year's request.

The items listed under total program refer to total actual and planned procurement, including R.D.T. & E., for all years.

A breakdown of total program, including:

Details on procurement quantities programmed for the future; inventory objectives; PAMN, RDT&E and MILCON costs; and total program costs, is available for each item on a second data slide, if you desire to see them.

Senator YOUNG. What is the cost of this new aircraft?

Admiral WEISNER. The flyaway cost is $5.5 million.

Senator YOUNG. It includes the new avionics?

Admiral WEISNER. Yes, sir. That includes the avionics.

AIRCRAFT UTILIZATION IN SOUTH VIETNAM

Chairman ELLENDER. Was this plane used in South Vietnam?

Admiral WEISNER. Yes, sir, Mr. Chairman. The A–6 has been used extensively in South Vietnam. I was there when the first squadron was introduced in South Vietnam and that was approximately 1965. I was on an east coast carrier that we took around to South Vietnam.

ECONOMICAL PROCUREMENT RATE

Chairman ELLENDER. Admiral, earlier you indicated that you were limited to requesting 12 of these aircraft for fiscal year 1973. However, I note on the data sheet that only 12 were funded in 1971 and only 12 in fiscal year 1972. Is it your contention that the procurement of these aircraft at the rate of 12 per year is less than the most economical production rate, and if so, what number would be the most economical production rate, based on your total requirement for [deleted] aircraft?

Admiral MCCLELLAN. Yes, sir; you are correct. Twenty-four per year would be a more economical and practical rate to realize and maintain the force level objective.

FINANCING OF A–6E

Chairman ELLENDER. I want to be sure I understand the cost data on these 12 aircraft. As I understand the data sheet, you estimate that these 12 aircraft will cost $100.3 million, exclusive of initial spares, of

which $3.7 million was provided for advance procurement in fiscal year 1972, leaving a net requirement of $96.6 million in the 1973 request for these 12 aircraft. Have I stated this correctly?

Admiral McClellan. Yes, sir; in addition there is $1.7 million advance procurement for fiscal year 1974 for a net requirement of $98.3.

Senator Young. I note on the data sheet that the 12 aircraft funded in fiscal year 1972 cost only $93.2 million, giving a procurement unit cost of approximately $7.8 million per aircraft. However, as was indicated earlier, the 12 aircraft in the 1973 program will cost $100.3 million, which equates to a procurement unit cost of $8.4 million. Just what accounts for this increase?

Admiral McClellan. The unit cost increase equated to aircraft price increase is misleading. As you know the support requirements do not have a direct relationship to the aircraft quantity procurement but equates to the planned aircraft utilization specified in the weapon system planning directive. Accordingly, there are additional outfittings and the introduction of new repair capabilities in fiscal year 1973.

Chairman Ellender. Let me approach this same problem from a different angle. On the aircraft cost analysis sheet, I note that the flyaway cost of the 12 aircraft in the fiscal year 1973 program is approximately $65.4 million, compared to $66.9 million for the flyaway cost of the 12 aircraft in the 1972 program—a small decrease. However, with respect to the support costs, you are requesting $34.9 million for the 12 aircraft in the 1973 program, compared to only $26.3 million for the support costs for the 12 aircraft in the 1972 program. Would you please elaborate on this matter?

Admiral McClellan. Yes, sir; as I previously stated, there are additional outfittings, three in fiscal year 1972 and five in fiscal year 1973. In addition thereto, the new increased repair capability will permit the detection of a defective unit to the shop replaceable assembly (SRA) vice the weapon replaceable assembly, a significant assist to maintenance. It also provides for a search radar repair complex that also has significant reliability/maintainability equivalent to that we are experiencing on the aircraft systems. This will also be a significant assist to maintenance.

Initial Spares

Chairman Ellender. It is indicated on the aircraft data sheet that you are requesting $8.9 million in fiscal year 1973 for initial spares for support of these 12 aircraft. For the 12 aircraft included in the fiscal year 1972 program $11.4 million was provided for the procurement of initial spares. Just how do you compute this requirement for initial spares?

Admiral McClellan. We budget spares support requirements in the following categories; engines, other GFE, contractor support, Navy support and peculiar ground support equipment. In the case of the A–6E, $.8 million is budgeted for other GFE, $6.5 million for the Navy support and $1.6 million for peculiar ground support equip-

ment. I will be happy to submit a paper on the methodology involved in computing initial spares requirements.

(The information follows:)

The aircraft initial spares provide for initial site outfitting and pipeline (initial system backup stocks) in support of new or add-on increments of end items (aircraft/equipments) being introduced into the Navy, phased by fiscal year. Investment requirements are determined by the number, type, and deployment of aircraft being procured and entering the operating program. While investment spares are in support of the end items procured in other PAMN budget activities, actual budgeting and procurement is scheduled in the fiscal year in which the contract must be let to meet operating support requirement. Requirements for engines, major avionics equipments, and other equipments with a significant unit cost are calculated on an item-by-item basis, considering usage data and failure rates, or by utilizing engineering estimates of predicted usage for new components. Requirements for other investment spares and spare parts are calculated on a statistical basis, using the same criteria used for calculating major spare equipment requirements.

(1) *Government Furnished Spare Aircraft Engines*—Spare aircraft engine requirements are calculated on an actuarial basis to support the aircraft operating program with a confidence level of 80%–90% that a spare engine will be on site and ready-for-issue when required. These spare engines are for the following purposes: (a) provide for initial outfitting of short sites and carriers; (b) fill maintenance repair/overhaul pipelines; and (3) provide replacement for an installed engine that is not functioning properly or has reached its maximum authorized operating time.

(2) *Other Government Furnished Equipment (GFE) Spares*—This category includes spare equipments of aeronautical GFE for which the Naval Air Systems Command headquarters must retain engineering management, and, hence procurement responsibility. These equipments are generally those which are subject to design changes either because they are related to new aircraft programs or because of the likelihood of incorporating improvements in the equipments. These equipments, along wtih spare engines and Navy support material, represent the assets necessary for meeting initial outfitting and pipeline requirements.

(3) *Contractor Support*—Prime contractor furnished material and repair services are provided for support of new, sophisticated weapon systems during their development, test and fleet introductory phases until Navy Support Date (NED), at which time the Navy supply system assumes responsibility for providing all spare and spare parts. This contractor support is designed to preclude procurement of unnecessary or unusable spare parts before usage date is available or aircraft equipment design is frozen. Contractor support includes initial outfitting at test and deployment sites, material replacement, material management, and provisioning services.

(4) *Navy Support*—The Aviation Supply Office (ASO) must purchase investment spares and repair parts under its management cognizance to initially outfit shore sites and carriers and back-up system pipeline stock in support of new or additional aircraft, engines or installed systems. Navy support responsibility commences at the beginning of a new program for GFE and at the Navy Support Date for prime contractor material.

(5) *Peculiar Ground Support Equipment (PGSE)*—This category of spares and spare parts supports new and in-use peculiar ground support equipment at shore stations and on carriers.

PERFORMANCE CHARACTERISTICS DEMONSTRATED

Senator YOUNG. As I read the performance data on page 2 of the data sheet, it appears that all the performance characteristics of the

A–6A have been demonstrated in your test program. Am I right about this?

Admiral McCLELLAN. Yes, sir.

UNIT COST

Senator YOUNG. In looking at the cost history comparison data on page 4 of the data sheet, I note that the original program was based on procurement of 60 of these aircraft at a unit program acquisition cost of approximately $9.6 million. How does this compare to the current estimated unit acquisition cost based on the production of [deleted] aircraft?

Admiral McCLELLAN. The unit cost for [deleted] aircraft is [deleted] million now as compared to $9.6 million for 60 aircraft.

1974 ADVANCE PROCUREMENT

Senator YOUNG. I note on line 3 of the P–1 exhibit a request of $1.7 million for advance procurement to support the planned fiscal year 1974 procurement of the A–6E aircraft. How many aircraft are in your planned program for fiscal year 1974?

Admiral McCLELLAN. We are planning on a procurement of [deleted] aircraft in fiscal year 1974.

Senator YOUNG. What will this $1.7 million be obligated for, and when do you expect to obligate these funds?

Admiral McCLELLAN. The $1.7 million will be obligated mostly for engines and other GFE items that require more than 18 months' production leadtime. These funds will be obligated by April 1973.

EA–6B AIRCRAFT

Chairman ELLENDER. If there are no further questions on the A–6E aircraft we will proceed with the request for the EA–6B electronic warfare aircraft. The aircraft data sheet will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—AIRCRAFT DATA SHEET

Service: Navy—Nomenclature: EA–6B (Electronic Warfare) P–1 Line Item No. 4; Popular Name: Intruder

Description/Mission.—The EA–6B is a four place derivation of the highly successful A–6 attack aircraft, and includes a computerized electronic surveillance and control system and eleven high-powered jamming transmitters in various frequency bands. The EA–6B's primary mission is electronic warfare, i.e. suppression and degradation of defenses by jamming enemy radar controlled weapons. Additional missions include: passive early warning for fleet defense; battlefield electronic surveillance; and training of friendly forces.

COST DATA

[In millions of dollars]

	Fiscal year—								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity	20.0	8.0	12.0	7.0						47.0
Cost	314.7	151.9	163.4	166.5	47.8	27.9				872.2
Less Advance procurement, prior year	−33.8	−5.0	−8.2	−31.7						−78.7
Net current year program	280.9	146.9	155.2	134.8	47.8	27.9				793.5
Plus: Advanced procurement, current year	+38.8	+8.2	+31.7							+78.7
Procurement unit cost	16.6	19.0	13.6	23.8						19.0
Weapon system cost	319.7	155.1	186.9	134.8	47.8	27.9				872.2
Initial spares	33.6	39.3	15.9	46.8	7.4					143.0
R.D.T. & E	172.1	12.0	15.0	3.6						202.7
Milcon	1.0									1.0
Program acquisition cost	526.4	206.4	217.8	185.2	55.2	27.9				1,219.8
Program unit cost										25.9
Total additional cost			5.5	6.4	26.0	27.3	22.1	6.0		[1] 93.3

[1] Funds are programed for modification with the expanded capability countermeasures system. This system was not available when these aircraft were on the production line. 23 aircraft are required to be modified since 2 aircraft have been attrited and 2 of the 4 preproduction aircraft will be modified in the EXCAP R. & D. program. Additionally, funds are included for engine and ejection seat retrofit and plenishment spares.

Basis for fiscal year 1973 Budget Request.—The seven EA–6B's requested in FY 1973 are the final increment of procurement to update the Navy's vital airborne electronic countermeasures (ECM) capability. The program of 47 aircraft provides eight 4-plane squadrons plus training and repair pipeline aircraft. The FY 1972–1973 increment will be equipped with an "expanded capability" electronic countermeasures system to enable the EA–6B to counter the latest ECM threats [deleted].

Test Data:

NPE (Navy preliminary evaluation) No. 1	December 1968
NPE (Flying qualities and performance) No. 2	August 1969
NPE (ECM system)	February 1970
First flight (Board of inspection and survey aircraft)	April 1969
BIS begin/end	May 1970/August 1971
Begin development of EXCAP (Expanded capability)	May 1970
Contractor flight testing of EXCAP	February 1972
NPE of EXCAP system	[Deleted]
Acceptance of first production aircraft with EXCAP	[Deleted]

BIS trials which were conducted at the electronic warfare range at Eglin Air Force Base, Fla. were completed in August 1971. The BIS program lasted more than 15 months, involved more than 300 flights on five aircraft and resulted in no major discrepancies.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	Grumman Aerospace Corp	Fixed price incentive.
Engine	United Aircraft Corp., Pratt & Whitney Division	Fixed price incentive, successive target.

	Classification	Requirement	Demonstrated
Performance:			
Speed/maximum sea level		516 knots	509 knots.
Takeoff—distance (50 ft. obstacle).		5,530 ft	4,360 ft.
Radius/range (combat)		304/1,942 nautical miles	304/1,942 nautical miles.
Combat ceiling		34,000 ft	34,000 ft.

Characteristics:	*Demonstrated*
Weight, take off (lbs.)	58,800
Dimensions (length/span) (ft.)	59/53
Crew	4

[Deleted.]

COST HISTORY COMPARISON

	Quantity	Amoun
Initial planning estimate:		
Procurement	50	$583.7
R.D.T. & E	1	234.0
Milcon		
Total program cost	51	817.7
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	46	858.6
R.D.T. & E	1	202.7
Milcon		1.0
Total program cost	47	1,062.3
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	46	1,015.2
R.D.T. & E	1	202.7
Milcon		1.0
Total program cost	47	1,218.9

Note.—Difference between fiscal year 1972 and fiscal year 1973 submissions: Increased costs reflect less economical production resulting from deferral of 7 aircraft from fiscal year 1972 to 1973, and procurement and support costs for the expanded ECM capability, including ECM pod costs in fiscal year 1974 and 1975.

Admiral WEISNER. The EA–6B is the first naval tactical jammer system which was designed and built specifically for tactical electronic warfare with integrated high-powered electronic jammers and modern state-of-the-art receivers under computer direction.

CARRIER-BASED AIRCRAFT FOR SUPPORT OF STRIKE AND RECONNAISANCE MISSIONS

A derivative of the A–6A, it is a four-place, carrier-based aircraft which is capable of radiating electromagnetic energy to degrade enemy radar and communication lines in support of our strike or reconnaissance missions. By depriving the enemy of the information necessary to counter our tactics, we enhance the mission success and survivability of our strike forces.

INSPECTION, FIRST DEPLOYMENT, AND AIRCRAFT LOSS

The Board of Inspection Survey (BIS) report has confirmed the effectiveness of the system and the EA–6B continues to meet schedule and technical milestones.

First deployment is scheduled for [deleted] aboard [deleted]. This was in the [deleted]. One aircraft was lost last November due to a catastrophic disintegration of the engine starter which induced an engine failure and complete hydraulic loss with subsequent loss of control. An engineering change to correct this deficiency is being incorporated at this time.

PLANNED PROGRAM AND 1973 FUNDING

A total procurement program of 46 EA–6B's is currently planned. This program is not sufficient to provide EA–6B's for each CV/CVA, nor does it allow for Marine requirements as replacement for their aging and obsolescent EA–6A's. A total program of [deleted] EA–6B's is required to meet Navy and Marine requirements.

TOTAL REQUIREMENT COMPUTATIONS

Chairman ELLENDER. Just how did you compute your total requirement for [deleted] EA–6B's?

Admiral WEISNER. The requirement for [deleted] EA–6B was computed as follows: [Deleted] EA–6B for each Navy carrier [deleted] replacement of [deleted] Marine EA–6A with EA–6B, plus training, pipeline and attrition for both Navy and Marine Corps. This is computed as follows: [Deleted.]

Senator YOUNG. Inasmuch as the current approved program only includes 47 of these aircraft, is it correct to assume that the Department of Defense has not approved this total requirement of [deleted] of these aircraft?

Admiral WEISNER. As of this date the Department of Defense has not approved the [deleted] EA–6B requirement. We hope to have this approved during the ongoing update and revision to the 5-year Defense plan.

We are requesting $134.8 million and procurement of seven EA–6B's in fiscal year 1973. Initial spares require an additional $46.8 million.

Chairman ELLENDER. This is a new aircraft?

Admiral WEISNER. Yes, sir, Mr. Chairman. The first EA–6B's came off the line January a year ago.

JAMMING CAPABILITY

Chairman ELLENDER. It seems as though this is a very expensive plane. What is its main virtue?

Admiral WEISNER. Its main mission and virtue, Mr. Chairman, is a very great increase in power available for jamming AAA radars, SAM sites, and enemy communications. It can be used as a stand-off jammer, for example, in the Gulf of Tonkin; it can stay off over the water and jam in support of our strike airplanes going in. It could also accompany the strike airplanes on specific missions.

That is where it is considerably better than the old EKA–3, which incidentally is the oldest carrier airplane that we have operating from carriers.

Chairman ELLENDER. How is the jamming accomplished?

Admiral WEISNER. It has pods. It carries five pods. Which detect enemy radars and direct the energy available in the aircraft to jam the actual site, whether it be AAA radar or a SAM site, for example.

PRESENT INVENTORY AND 1973 PROCUREMENT

Chairman ELLENDER. How many of those do you have on hand now? You said you procured them since January a year ago.

Admiral WEISNER. The inventory as of January 1 is 14.

Chairman ELLENDER. Have you a follow-on program for fiscal year 1974?

Admiral WEISNER. We do not have any program for next year at the present time.

EA–6B COST

Chairman ELLENDER. Let me be sure I understand your request. As I read the data sheet, these seven aircraft are estimated to cost $166.5 million, which is offset by advance procurement of $31.7 million provided in fiscal year 1972, for the total P–1 request for $134.8 million. Is this correct?

Admiral MCCLELLAN. Yes, sir; that is correct.

INITIAL SPARES

Chairman ELLENDER. And in addition to that, you are requesting the $46.8 million for the procurement of initial spares. Is that correct?

Admiral MCCLELLAN. Yes, sir.

ADVANCE PROCUREMENT

Senator YOUNG. I note on the data sheet that your fiscal year 1973 request does not include any funds for advance procurement. I assume this is true because, as you stated, your planned program for fiscal year 1974 does not include funds for the procurement of any more of these aircraft. Is this correct?

Admiral MCCLELLAN. There are no EA–6B's currently programed in fiscal year 1974. We are attempting to fit additional EA–6B's, within

fiscal constraints, into the FYDP in fiscal year 1974 and subsequent to reach a procurement objective of [deleted] EA-6B's to meet Navy and Marine Corps requirements.

1974 and 1975 Projected Costs

Senator Young. I also note on the data sheet a projected cost of $47.8 million for fiscal year 1974 and $27.9 million for fiscal year 1975. Inasmuch as you are not requesting any aircraft in these years, just what are these funds for?

Admiral McClellan. The $47.8 million in fiscal year 1974 and $27.9 million in fiscal year 1975 is for buyout of 170 pods and 39 transmitter pairs in the currently approved program, and for retrofit of two sets of intermediate level support equipment to expanded capability configuration.

Unit Costs

Chairman Ellender. The fiscal year 1972 program includes 12 of these aircraft at a total procurement cost of $163.4 million, which equates to $13.6 million procurement unit cost per aircraft. I note that the fiscal year 1973 program of seven aircraft is based on a total estimated cost of $166.5 million, which equates to a procurement unit cost of $23.8 million. I note that, of this total, $3.6 million is an increase in the flyaway cost. What accounts for this?

Admiral McClellan. The increase of $3.6 million in flyaway cost from fiscal year 1972 to fiscal year 1973 is partially due to the greater number of tactical jammer pods procured per aircraft. We procured a total of 31 pods with the 12 fiscal year 1972 aircraft, and 32 pods with the buy of 7 aircraft in fiscal year 1973. This difference accounts for $1.6 million of the $3.6 million. The remainder of the increase is accounted for by a later year buy, a reduced quantity of aircraft procured, the stretched delivery of 7 aircraft over twelve months and minor pricing variations.

Support Cost

Senator Young. The total support cost for the 12 aircraft in the 1972 program was $22.8 million, and the request for support cost for the 1973 buy of seven aircraft is $59.7 million. Comment generally on this tremendous increase in the support cost for this aircraft, and I wish you would comment specifically on the increase for airframe peculiar ground support equipment and "ILS/facility readiness/RR site survey/activation."

Admiral McClellan. Integrated logistic support, of ILS, is a phased requirement which has no relationship to the number of aircraft procured in a given year. It is mainly a site-associated support cost. Each 4-plane EA-6B squadron formed requires organizational support equipment. In fiscal year 1973 we are buying two organizational level outfittings. A much higher cost item is support equipment for an intermediate level repair activity—a shipboard or shore-based aircraft maintenance department. These are the large pieces of test equipment which allow our technicians to trouble-shoot and repair the complex avionics equipment. Three such "I" level activities are funded in fiscal year 1973. We are also funding our depot level repair

activity for major overhaul of our equipment. This is an expensive but necessary step to insure that we are not tied to the contractor or vendors with expensive commercial repair contracts for life of type. The integrated logistic support costs are comparatively high because of the introduction of expanded capability. This calls for modifications of the basic support equipment, training equipment and courses, site activations and repair-of-repairables and inventory management during the contractor support period until full Navy organic support can be provisioned.

INITIAL SPARES

Chairman ELLENDER. I note that your planned program for fiscal year 1974 includes $7.4 million for the procurement of initial spares for this aircraft, even though you do not plan to buy any aircraft in 1974. Please comment on this matter.

Admiral MCCLELLAN. At the present time no EA-6B aircraft are budgeted in fiscal year 1974. In that year, however, we will still continue to procure pods with the expanded capability. The $7.4 million budgeted in fiscal year 1974 for initial spares supports this procurement.

PERFORMANCE REQUIREMENTS

Chairman ELLENDER. In looking over the performance data on page 2 of the aircraft data sheet, I get the impression that all of the performance requirements for this aircraft have been demonstrated as of this date. Is this correct?

Admiral MCCLELLAN. Yes, sir. All of the performance requirements for the EA-6B have been demonstrated. In almost every case the performance has exceeded requirements—in take-off distance, power approach speed specific range, and especially in the technically significant area of effective jamming power. Maximum speed at sea level was less than 1 percent below requirement. The uprated Pratt and Whitney J52 P-408 engine, which provides about 25 percent more thrust, has already been approved for the EA-6B program and is being incorporated in production in the 17th and subsequent aircraft. Earlier aircraft will be retrofitted with the uprated engine during the first overhaul period.

INCREASE IN COST

Chairman ELLENDER. I call your attention to the cost history comparison data on page 4 of the aircraft data sheet. The original program based on the production of [deleted] aircraft was based on a total program acquisition cost of $817.7 million, or [deleted] per aircraft. The current estimate based on the production of [deleted] aircraft is based on a total acquisition cost of $1,218.9 million, or [deleted] per aircraft. Comment generally on the tremendous increase in the cost of this aircraft.

Admiral MCCLELLAN. The increase from the development estimate of $817.7 million to the current estimate of $1.2 billion is essentially for directed program stretchout and additional program scope, providing a quantum increase in capability. The original program involved a procurement of 46 production aircraft, starting in fiscal year 1969 with deliveries over a 24-month period. This procurement was confined

to a basic configuration which addressed the [deleted] threats of the mid-1960's, and was not responsive to the full threat spectrum. There were a total of 105 tactical jamming pods in the basic program. The current program includes 42 production aircraft, commencing a year later than the original program, with deliveries spanning 4 years vice 24 months. The current program aircraft are configured with expanded capability to meet the current and projected threats of the 1970's. This was made possible by the building block approach adopted from the outset of the program. The current program also includes 170 TJS pods and 39 transmitter pairs which add to fleet capability and flexibility to counter worldwide threats.

Contractor Overhead

Chairman Ellender. Referring again to the increase in the flyaway cost of this aircraft, I note on the aircraft cost analysis sheet that the flyaway cost on the airframe is expected to increase from $9.6 million per aircraft for the 1972 buy to $13.4 million per aircraft for the 1973 buy. Is any of this increase the result of increased contractor overhead being charged to this program as a result of the reduced business base of the firm contractor?

Admiral McClellan. The increase in the airframe unit cost from fiscal year 1972 to fiscal year 1973 is not attributable to increased overhead resulting from a reduced business base but is more a factor of the particular procurement in the 2 years involved. We are buying 31 jamming pods with the 12 aircraft in fiscal year 1972, and 32 pods with the seven aircraft in fiscal year 1973. This accounts for $1.6 million of the unit airframe increase. The remainder is accounted for by a later year buy, a reduced quantity of aircraft procured, and the stretched delivery of seven aircraft over 12 months, and minor pricing variations.

A–7E attack aircraft

Chairman Ellender. If there are no further questions, we will proceed with the consideration of the request for the procurement of the A–7E attack aircraft. The aircraft data sheet will be included in the record at this point.

(The information follows:)

President's Budget Estimate—Aircraft Data Sheet

Service: *Navy—Nomenclature*: A–7E, P–1 Line Item no. 6, 7; Popular Name: *Corsair II*

Description/Mission.—The A–7E aircraft is a land/carrier-based subsonic, medium range, light attack aircraft carrying all types of conventional ordnance while performing close air support or interdiction missions. The A–7E provides a substantial increase in navigation accuracy, weapons delivery accuracy, radius, and load carrying capability over the A–7A/B and A–4 series which it replaces in the Navy inventory. The A–7E also has a nuclear delivery capability.

COST DATA

[In millions of dollars]

	Fiscal year—								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity	344.0	30.0	24.0	24.0	[Deleted]					
Cost	978.7	113.3	80.0	99.2	112.6	109.6	170.1	239.5		1,903.0
Less: Advance procurement prior year	−46.4	−4.4	−1.9	−.9	−7.5	−9.1	−13.8	−20.7		−104.7
Net calendar year program	932.3	108.9	78.1	98.3	105.1	100.5	156.3	218.8		1,798.3
Plus advance procurement calendar year	+50.8	+1.9	+.9	+7.5	+9.1	+13.8	+20.7			+104.7
Procurement unit cost	2.8	3.8	3.3	4.1	[Deleted]					
Weapon system cost	983.1	110.8	79.0	105.8	114.2	114.3	177.0	218.8		1,903.0
Initial spares	159.2	27.5	8.0	9.1	7.7	7.8	8.3	10.6		238.2
R.D.T. & E	19.2									19.2
MILCON	1.1	.5								1.6
Program acquisition cost	1,162.6	138.8	87.0	114.9	121.9	122.1	185.3	229.4		2,162.0
Program unit cost										[Deleted]
Total additional cost	9.7	10.8	20.6	13.9	14.6	14.2	13.9	14.2		111.9

Basis for FY 1973 Request.—24 aircraft are requested to continue modernization of Navy light attack forces by replacement of the older and less capable A–7A/B's and A–4's. [Deleted] A–7E squadrons are funded through FY 1972, while the force goal is [deleted] squadrons.

Test Data.—All testing has been completed.

CONTRACT DATA

Major subsystems	Contractor	Type of last contract
Airframe	LTV Aerospace Corp., Vought Aeronautics Division	Fixed price incentive.
Engine	General Motors Corp., Allison Division	Fixed price redeterminable.

	Classification	Operational requirement	Demonstrated
Performance:			
Speed: Maximum speed at sea level	U	505 knots	555 knots.
Radius/range: Primary attack mission with 3,600 lbs. of bombs abroad.	U	537 nautical miles (nm)	475 nm.
Combat ceiling	U	35,500 ft	35,500 ft.
Characteristics:			
Weight	U		
Empty		17,569 lbs	18,165 lbs.
Normal takeoff		33,273 lbs	34,159 lbs.
Maximum takeoff		38,000 lbs	42,000 lbs.
Dimensions	U		
Length overall			46.13 ft.
Wingspan, spread			38.73 ft.
Wingspan, folded			23.77 ft.
Height			16.06 ft.
Wing area			375.0 sq. ft.
Engine	U		TF41–A–2.

[Deleted.]

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	595	$1,446.3
R.D.T. & E		19.3
Milcon		
Total program costs	595	1,465.6
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	512	1,876.2
R.D.T. & E		19.2
Milcon		1.6
Total program costs	512	1,897.0
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	[Deleted]	2,141.2
R.D.T. & E		19.2
Milcon		1.6
Total program costs		2,162.0

Difference between FY 1972 and FY 1973 submissions.—The additional [deleted] aircraft will replace projected attrition, maintain a light attack production base and provide modest progress toward the objective of an all A–7E light attack force.

Admiral WEISNER. The A–7E is a single-place, attack aircraft which is the mainstay of the Navy's carrier based attack force. Its performance in combat in Southeast Asia has been outstanding. It provides a substantial increase in bombing accuracy, combat radius and load-carrying capability over previous light attack aircraft.

Its navigation/weapons delivery system enables aviators with com-

paratively little combat experience to achieve combat bombing accuracy far better than results achieved with previous visual attack systems.

The A–7E has proven to be both reliable and highly maintainable, with all of these superior capabilities proven in deployments of A–7E's to the Mediterranean and Southeast Asia, as well as in operational testing of the system.

PLANNED PROGRAM AND 1973 FUNDING

In fiscal year 1973, [deleted] of the [deleted] Navy light attack squadrons will be equipped with the A–7E. Our objective is an all A–7E force. At this time, a total procurement program of [deleted] A–7E's is planned—and 398 have been approved for procurement through the fiscal year 1972 budget. This procurement is not sufficient to reach the desired all A–7E active force level.

A–7E REQUIREMENTS

Senator YOUNG. How many of these aircraft would be required to permit you to reach your goal of an all A–7E active force?

Admiral WEISNER. We reach our requirement as follows: [Deleted.]

These numbers are required to achieve an all A–7E force. FYDP procurement does not now support this objective. Representative procurement required to achieve this objective by fiscal year 1979 is: [Deleted.]

$105.8 million is requested in the fiscal year 1973 budget for the procurement of 24 A–7E aircraft to sustain A–7 force levels and continue the modernization of the light attack force by replacing attrited A–7A/B aircraft with new production A–7E's. Initial spares require an additional $9.1 million.

A–7E FUNDING

Chairman ELLENDER. Let me be sure I understand your request. As I understand the data sheet, you estimate that these 24 aircraft will cost $99.2 million, which is offset by advance procurement provided in 1972 of $900,000, giving a net requirement of $98.3 million for these aircraft. In addition, you are requesting $7.5 million for advance procurement to support your planned procurement of this aircraft in 1974, which gives the total of $105.8 million. And, as you indicate, there is an additional request of $9.1 million for initial spares. Have I stated this request correctly?

Admiral MCCLELLAN. Yes, sir; the request as stated is correct for a procurement of 24 A–7E's in fiscal year 1973.

PRESENT INVENTORY AND WEAPONS DELIVERY CAPABILITY

Chairman ELLENDER. How many of these aircraft have you on hand?

Admiral WEISNER. The inventory as of January 1 was 310. Previously funded, but not delivered were 54.

Chairman ELLENDER. Have these been used in Southeast Asia?

Admiral WEISNER. These have been used in Southeast Asia, Mr. Chairman. The first squadron came out about 1969.

One of the advantages of this airplane is that its weapons system gives it greater accuracy than we had in the airplane which it replaces. We are down to averaging approximately [deleted] mils accuracy. This could be contrasted, for example, with the older systems whose accuracy was in excess of [deleted] mils. It also has an improved navigation capability. That is part of its avionics, too.

Chairman ELLENDER. Can you backfit those improvements on the older A–7's?

Admiral WEISNER. We don't think in this case we will backfit the A–7A's. For one thing, there is a different engine in this airplane, the TF–41 instead of the TF–30. The A–7A airframes have been subjected to considerable use. We do not think it would be economical to try to backfit those as we are doing with the A–6E's.

INCREASE IN COST

Chairman ELLENDER. Again, we have a significant increase in the cost of these aircraft. The 24 aircraft included in the 1972 program cost $80 million, which gives a procurement unit cost of $3.3 million. As I indicated, the fiscal year 1973 request is based on 24 aircraft at a cost of $99.2 million, which gives a procurement unit cost of $4.1 million. Here the major portion of the increase is in the flyaway cost of the aircraft rather than in the support cost. Would you please comment on the increase of approximately $950,000 in the flyaway cost of this aircraft and especially the increase in the flyaway cost of the airframe and the engines?

Admiral MCCLELLAN. The increase to the airframe unit cost is, in most part, attributed to the fact that the Navy will be required to absorb a larger share of engineering and overhead costs since the USAF does not have a fiscal year 1973 buy of A–7D aircraft. A reduction in delivery from 10 aircraft per month, fiscal year 1972 USN/USAF, to two aircraft per month, USN only, has resulted in higher costs to the Navy since Navy must bear a larger share of materials and manufacturing costs.

The TF41 engine is currently used only in the Navy A–7E, TF41–A–2, and the USAF A–7D, TF41–A–1. The fixed burden costs previously shared with the USAF will be borne by the Navy and therefore results in an increased engine unit cost also.

SUPPORT COST

Chairman ELLENDER. Of the total estimated cost of $99.2 million for these 24 aircraft, approximately $12.2 million is for support cost. Please comment on the most significant items included in this total of $12.2 million for support cost.

Admiral MCCLELLAN. Yes, sir; perhaps the most significant item in the support area is under avionics peculiar ground support equipment. The $3.6 million reflected is required to provide bulk ammunition loaders for the M–61 gun. This bulk loader has been designed for use with the F–14 also. It will save both time and manpower by requiring less handling of ammunition, no belting with links, and allowing faster aircraft loading. An amount of $2.5 million is required for new and updated handbooks and maintenance manuals. These various publications are necessary to keep the fleet informed of the latest changes to the aircraft in order to insure proper and effective maintenance.

ADVANCE PROCUREMENT

Chairman ELLENDER. As I indicated earlier, the total requested for fiscal year 1973 includes $7.5 million for advance procurement to support your planned procurement of this aircraft in fiscal year 1974. How many aircraft are in your planned program for fiscal year 1974?

Admiral MCCLELLAN. The current plan calls for a buy of [deleted] A–7E's in fiscal year 1974.

Senator YOUNG. What will these funds be obligated for, and when will these funds be obligated?

Admiral MCCLELLAN. Included in the $7.5 million being requested is $7.013 million for eight TF41–A–2 engines. These funds will be obligated in April 1973. The remaining $487,000 is for Government furnished equipment items that require advance procurement funds. Obligations will commence in January 1973.

COMBAT RANGE

Senator YOUNG. As I recall, one of the basic features that was discussed when this aircraft was first presented was its long combat range. I noticed on page 2 of the aircraft data sheet under the performance data that you state an operational requirement of 537 nautical miles combat radius with 3,600 pounds of bombs, and that you indicate that the aircraft has demonstrated only 475 nautical miles. Would you please comment on this matter?

Admiral WEISNER. As you well remember Mr. Chairman, the first 68 of these A–7E's (since redesignated A–7C's for ease of identification) were produced with the TF–30 engine, which was also used in the earlier A–7B. For the A–7D and E in a joint program with the USAF, it was decided to utilize the TF–41, which increased available thrust from the 12,000-pound range to the 15,000-pound range. This resulted in not only increased maneuverability, but an increase in top speed, increased maximum takeoff weight from 38,000 to 42,000 pounds, and significantly reduced takeoff roll from 7,025 to 4,800 feet in comparable configuration. The fact is that with the improved payload capability, additional external fuel could be carried with the same performance as the earlier series (TF–30 powered) and in so doing actually demonstrate a range extension. For the purpose of this test, however, internal fuel only was allowed, which resulted in the modest range decrement from 537 nautical miles to 475. The overall performance improvement was considered to be a worthwhile tradeoff for the minor reduction in radius of action on internal fuel.

ROLLS-ROYCE ENGINE

Chairman ELLENDER. As I recall, the engine used in the later version of this aircraft is an American-made version of a Rolls-Royce engine. Am I correct about this?

Admiral MCCLELLAN. Yes, sir; that is correct.

INCREASE IN AIRCRAFT COST

Chairman ELLENDER. On page 4 of the data sheet under the cost history comparison information, it is indicated that the original plan-

ning estimate for this program called for the procurement of 595 of these aircraft at a total program cost of $1,465.6 million, or $2,563,000 per aircraft. The fiscal year 1972 budget submission was based on production of 512 aircraft at a total estimated cost of $1,897 million, or $3,705,000 per aircraft. I note that the current classified estimate is [deleted]. Generally speaking, just what caused the tremendous increase in the cost of this aircraft?

Admiral McCLELLAN. The total program cost of $1,465.6 million was based on the procurement of 595 Navy A–7E's over a 5-year program, fiscal year 1967 through fiscal year 1972, with an accompanying USAF total program of 517 A–7D's and a planned smooth, regular production. This, as you know, was changed to a total planned procurement of 512 A–7E's for Navy, and a reduced "stretched" buy of 387 A–7D's for the USAF. This, combined with small annual quantities programed over a period from fiscal year 1967 to fiscal year 1976 increased the total program cost to $1,897.0 million.

The planned program was then changed to a revised Navy quantity of [deleted] aircraft over the period from fiscal year 1967 to fiscal year 1977. The net addition of [deleted] aircraft combined with a change in all planned procurements after fiscal year 1973; that is, the fiscal year 1974 buy was reduced by a quantity of [deleted], the fiscal year 1975 buy was reduced by a quantity of [deleted], fiscal year 1976 was increased by [deleted] and an additional quantity of [deleted] was added in fiscal year 1977.

The change in total planned procurements and the fact that the A–7D production is currently programed to terminate with the fiscal year 1972 buy accounts for the total program cost of $2,153.9 million.

AV–8A HARRIER V/STOL AIRCRAFT

Chairman ELLENDER. If there are no further questions on the A–7E aircraft, we will proceed with the discussion of the Marine Corps' AV–8A Harrier V/STOL aircraft. The aircraft data sheet on the Harrier will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—AIRCRAFT DATA SHEET

Service: Navy—Nomenclature: AV–8A P–1 Line Item No. 8,9; Popular Name: Harrier

Description/Mission.—The AV–8A HARRIER is a single piloted, single fan jet transonic vertical/short take-off and landing (V/STOL) aircraft distinguished by a shoulder mounted swept wing and swept tailplane, a single vertical fin and rudder, and rotatable engine thrust nozzles located two on each side of the fuselage. The HARRIER is powered by a Rolls Royce Pegasus F402–RR–401 vectored thrust engine of 21,500 lb. thrust. The HARRIER is required to exploit the vast potential of V/STOL light attack air support in Marine air-ground concepts, including greatly increased dispersal, more rapid response to requirements of ground forces, and significantly increased tactical flexibility.

COST DATA

[In millions of dollars]

	Fiscal year								Cost to complete	Current estimate, total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity	12	18	30	30	24					114
Cost	42.3	75.4	100.5	120.3	108.9					447.4
Less advance procurement, prior year		−8.0	−6.9	−12.0	−7.1					−34.0
Net current year program	42.3	67.4	93.6	108.3	101.8					413.4
Plus advance procurement, current year	+8.0	+6.9	+12.0	+7.1						+34.0
Procurement unit cost	3.5	4.2	3.4	4.0	4.5					3.9
Weapon system cost	50.3	74.3	105.6	115.4	101.8					447.4
Initial spares	15.5	12.4	8.1	17.7	18.5					72.2
R.D.T. & E										
Milcon			.1							.1
Program acquirement cost	65.8	86.7	113.8	133.1	120.3					519.7
Program unit cost										4.6
Total additional cost			1.5	1.0	2.3	2.8	2.8			10.4

Basis for FY 1973 Request.—The 30 AV–8A aircraft proposed for FY 1973 procurement are required for the third AV–8A USMC squadron. This squadron, along with allowances for pipeline and attrition, is required to maintain USMC tactical aircraft force levels as F–4 squadrons are phased out.

TEST DATA

(*a*) Navy Preliminary Evaluation (NPE) : Begin/end January 1969.
(*b*) Board of Inspection and Survey Trials: Start January 1971/completed April 1971.
(*c*) Fleet introduction : April 1971.

The BIS on the HARRIER was completed in April 1971. The only major discrepancy noted was an excessively complicated pilot restraint system which will be corrected upon incorporation of a new seat, the SIIIS–3. This seat is scheduled for production installation in January 1973.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	Hawker-Siddeley Aviation, Ltd	Government-to-government agreement.
Engine	Rolls-Royce	Do.

	Classification	Requirement	Demonstrated
Performance:			
Speed/maximum/sea level	U	575	Not demonstrated, since the F402–RR–401 engine is not yet available.
Combat radius (3,000 lbs. payload, 650 ft. short takeoff).		230 nautical miles	
Maximum unrefueled ferry range.	U	1,000 nautical miles	
Combat ceiling	U	50,000 ft	
Maximum deliverable payload 50 nautical miles radius vertical takeoff (VTO) and vertical landing.		3,000 lbs	
Characteristics:			
Weight—empty	U	12,200 lbs	
Maximum VTO	U	17,800 lbs.	
Maximum conventional takeoff.		25,600 lbs	
Length/height/span		45.65/11.25/25.27 ft	
Engine model		F402–RR–400/401	
Engine thrust		20,500/21,500 lbs.	

[Deleted]

COST HISTORY COMPARISON

[Dollars in millions]

	Quantity	Amount
Initial planning estimate:		
Procurement	114	$503.6
R.D.T. & E.		
MILCON		
Total program costs	114	503.6
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	114	503.6
R.D.T. & E.		
MILCON		
Total program costs	114	503.6
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	114	519.6
R.D.T. & E.		.1
MILCON		
Total program costs	114	519.7

Difference between FY 1972 and 1973 submissions:

Increased costs result from the following: (1) addition of $28.9 million to reflect the devaluation of the dollar relative to the British pound; (2) addition of $5.5 million for incorporating an improved ejection seat. These increases have been partially offset by a decreased initial spares requirement (—$5.2 million) and revised total program pricing based on FY 1970 final costs (—$13.1 million).

AV–8A Funding

Chairman Ellender. As I understand the data sheet, this request of $115.4 million includes the following: $108.3 million directly associated with the 30 aircraft, which sum, along with $12 million advance procurement provided in fiscal year 1972, will provide $120.3 million for these 30 aircraft. You are also requesting $7.1 million for advance procurement to support the planned procurement of this aircraft in 1974, and this gives the total of $115.4 million. Am I correct about this?

Admiral McClellan. That is correct, sir.

Admiral Weisner. Sixty AV–8A's have been authorized for procurement thus far from our fiscal year 1970, 1971, and 1972 requests. Our fiscal year 1973 request is for $115.4 million to procure 30 AV–8A's toward a planned total program of 114 aircraft. Initial spares requires an additional $17.7 million.

Following congressional action on the fiscal year 1972 request, we plan to procure these aircraft in the United Kingdom.

Chairman Ellender. How many of these aircraft have been delivered, and how many are funded but not yet delivered?

Admiral Weisner. We have nine in the inventory now. Funded and undelivered, however, are an additional 50. Those, and there is one loss there, with the 30 this year and 24 next year would comprise the 114.

Marine Corps Aircraft: Close Air Support Capability

Chairman Ellender. What is the principal virtue of this airplane?

Admiral Weisner. This is an airplane that is now used by our Marine Corps, Mr. Chairman. They have found it to be a very versatile airplane. Major General Hill can elaborate on this to a considerable extent, if you would like, sir.

General Hill. This is one of our primary close air support aircraft, Mr. Chairman, and it has many features which we need in order to improve the responsiveness and the effectiveness of our close-in support.

One of the great things is its basing flexibility. It does not need a long runway, a catapult, arresting gear, for example, as in a carrier. It has basing flexibility which permit basing the aircraft close to the front lines to obtain optimum responsiveness for close air support. We have been operating now for a year in this country. We have found it exceeds our expectations as to performance and capabilities.

Admiral Weisner. I should have said initially, Mr. Chairman, that this is a V/STOL airplane.

General Hill. This airplane has over 25,000 hours on it, Mr. Chairman. It is operated now by the Royal Air Force. They have two squadrons [deleted] in Germany.

Our program is for three squadrons in the Marine Corps. Since we have been operating the AV–8A in this country we have accumulated

over 2,000 flight hours. As I indicated, it has lived up to all the hopes and expectations that we had planned for it.

PROCUREMENT FROM ENGLAND

Chairman ELLENDER. That is one of the controversial planes, as far as Senator Symington is concerned because purchases are made abroad instead of producing them here. He is not able to be here today, but I am wondering if you can tell us what the future holds for the production of this plane in this country instead of buying them abroad?

Admiral WEISNER. This year's budget, Mr. Chairman, is based on a procurement in the United Kingdom. As you have said, it was a controversial item last year and it was the will of the Congress that they be procured there. The budget has been prepared with that thought this year.

Senator YOUNG. None of them are being procured here, I understand.

Admiral WEISNER. No, sir. All that we have procured for the Marines have been procured in the United Kingdom. This 30 buy is also budgeted for procurement in the United Kingdom.

SPEED AND V/STOL FLEXIBILITY

Senator YOUNG. What is the speed of that airplane?

General HILL. 575 knots level, Senator Young. It has a capability of 1.2 Mach in a dive.

Senator YOUNG. That is a good speed for V/STOL.

General HILL. Yes, sir. It has all the virtues of a high-speed fighter attack aircraft. At the same time, it has the virtue and flexibility of landing like a helicopter. It combines the best of two worlds into one airplane.

UNITED STATES, GERMAN, AND BRITISH TRIPARTITE RESEARCH

Senator YOUNG. Why is it that we have lagged in the research and development for this kind of airplane? Is there any particular reason?

General HILL. As you probably recall, sir, we have had 10 years of research and effort in this country in an attempt to develop a V/STOL operational capability. We entered into a tripartite arrangement with the Germans, and the British, back in 1966–67 in order to develop the old Kestrie, which was the forerunner of the AV–8A. The aircraft at that time had not developed to its full operational capability.

In 1968, the United States decided not to develop the Kestrie; any further. At that particular time, the British picked it up specifically as a result of a Royal Air Force request. The British picked it up and started to develop the Pegasus engine as well as the aircraft.

So that, in 1969, they developed this airplane which has an operational capability. At that particular time, since the Marine Corps had

had a long-standing requirement for V/STOL aircraft, we took a look at it to insure the aircraft was compatible with our amphibious mission. Since it proved to be operational, we requested procurement which was approved. We have not been able to develop in this country a V/STOL aircraft.

AIRCRAFT DEPLOYMENT

Senator YOUNG. How many have the British actually deployed [deleted].

General HILL. There are two squadrons in Germany and they have two more in England, a total of four tactical squadrons. Then they have a training squadron.

Senator YOUNG. How many in a squadron?

General HILL. Twelve aircraft in an RAF squadron. There will be 20 aircraft in the Marine Corps squadron.

Senator YOUNG. Where will they be placed in Europe [deleted]. Any particular place?

Admiral MCCLELLAN. Near the Holland border in Germany.

OPERATIONAL CAPABILITIES

General HILL. Incidentally, they are operating in a very expeditionary environment. They are operating off small pads, which is what we intend to do, small strips, even grass strips, and they have been very successful in their operations.

They have also conducted an exercise in which they deployed these aircraft and camouflaged them. They were absolutely undetected when photographs were taken of the deployed area. So, this aircraft has that capability.

In other words, it is not dependent on a long runway. If the runway gets bombed out, this airplane can still fly. We can also camouflage it and conceal it very easily along the frontlines.

Senator YOUNG. It would not have the capability of hovering over a jungle area as a helicoper could, would it?

General HILL. It would but you would not employ it that way, sir. You could do that; yes, sir, but you would not employ it as such. It would be employed as a high-speed fighter attack aircraft in a weapons delivery role.

Senator YOUNG. Would this be a match for the Mirage fighter craft?

General HILL. It has a capability of being a fighter aircraft with its speed, and maneuverability, with its vectored in-flight thrust capability and with the Sidewinders that we have on it. We have two 30-millimeter cannons. It is a dual mission aircraft and it has a capability of performing a fighter/attack role.

INVENTORY AND ANNUAL FUNDINGS

Chairman ELLENDER. You said you have nine in inventory and 50 that have already been funded. These will be funded in 1973 and 1974; is that right?

Admiral WEISNER. That is right, Mr. Chairman.

CONTRACT COSTS IN POUNDS

Chairman ELLENDER. I am informed that because of the devaluation of our dollar, the total cost of this program has increased by $28.9 million.

Can you tell us how that came about?

Admiral MCCLELLAN. Yes, sir. There is a government-to-government agreement between our government and the United Kingdom on the price of this airplane. It is expressed in pounds. At the time of the international devaluation last fall, the dollar was decreased in relation to the pound than originally planned, therefore more dollars are required to cover the pound price of this airplane.

Chairman ELLENDER. Suppose our monetary situation improved. Would we still have to pay the amount that is now in the contract in dollars?

Admiral MCCLELLAN. We have to pay the amount in pounds, sir. We are bound to the fluctuation in the international exchange rate, so far as the amount of dollars.

Chairman ELLENDER. Now or when delivery is made?

Admiral MCCLELLAN. When paid for, sir, we make bimonthly payments to the British based on estimated cost to be incurred.

Chairman ELLENDER. Suppose the value of the pound were to decrease, would the dollar cost be less?

Admiral MCCLELLAN. Yes, sir. If it went in the other direction, we would benefit.

Chairman ELLENDER. Proceed.

OPERATIONAL CAPABILITY

Admiral WEISNER. This airplane being procured for the Marines is a high performance V/STOL attack aircraft capable of delivery of conventional weapons in close support of ground forces.

This unique vertical and short takeoff and landing aircraft will make possible, for the first time, deployment of high performance tactical jet aircraft without the initial requirement for conventional airfields.

The AV–8A has the ability too operate from terrain other than prepared runway sites, thereby permitting basing flexibility similar to that for a helicopter.

Delivery has been taken on the first 10 aircraft of the fiscal year 1970 buy. Introduction of the AV–8A into the Marine Corps inventory has been orderly and without significant problems. Performance has equaled or exceeded expectations.

EVALUATION OF SEA CONTROL SHIP CONCEPT AND SORTIE VALIDATION TEST

Beginning this year, we will be using AV–8A's to evaluate the sea control ship concept. This extensive evaluation will last for 18 months and will conclude with an extended deployment aboard U.S.S. *Guam*. In addition, the Marine Corps will be conducting a sortie validation test in support of the OSD close air support (CAS) study.

SORTIE VALIDATION TEST

Senator YOUNG. When do you expect to complete the sortie validation test of AV–8A?

General HILL. These tests should be completed in late March or early April.

Senator YOUNG. When those tests are completed I would like to have a summary of the results. Mr. Chairman, I think that should be printed in the record.

Chairman ELLENDER. I agree. If we receive that summary in time it will be printed at this point in the record.

General HILL. We will make that information available to the committee as soon as possible.

(The following information was submitted:)

Conduct of the Test.—A field operation was conducted in the Cherry Point/Camp Lejeune area during the period 20–29 March 1972. Conditions were established which were representative of a combat environment and lent a high degree of credibility to the sustained and surge sortie rates achieved during the test. The AV–8A was operated from a main base, a facility, and five forward sites, including an existing road.

Requirements

6 AV–8A to be employed:	
9 days at 4.0 sortie rate	216
1 day at 6.0 sortie rate	36
Total	252

Of the total, the test rules required a breakdown as follows: 50% preplanned, 126 sorties; 20% alert, 51 sorties; 15% forward site, 38 sorties; 10% night, 26 sorties; 20% full-scale ordnance, 51 sorties.

Since the required categories could be combined—e.g. an alert sortie could be flown using full scale ordnance from a forward site—the percentages do not sum to 100%. Test results are highlighted as follows:

Sustained operations. The sustained combat sorties rate of 4.0, as established in OSD CAS (PHASE 1), was exceeded during the surge day of the test. DDR&E designated the second day (21 March)as the surge day. A sorties rate of 10.2 in 16.3 hours of operations was achieved.

Preplanned operations. The required 126 sorties were achieved by the ninth day. Total preplanned sorties flown was 166 (132%).

Alert operations. The required 51 sorties were achieved by the second day. Total alert sorties flown was 210 (412%).

Forward Site operations. The required 38 sorties were achieved by the fifth day. The total forward site sorties flown was 92 (242%).

Night operations. The required 26 sorties were achieved by the fourth day. The total night sorties flown was 33 (126%).

Full scale ordnance operations. The required 51 sorties were achieved by the second day. The total full scale ordnance sorties flown was 141 (276%).

DEMONSTRATED PERFORMANCE

AV–8A's capability to operate in the vertical mode and deliver 3,000 pounds of ordnance on a target 50 NM away and return was demonstrated on several occasions during the test.

AV–8A's capability to operate from existing roads with no adverse effects was demonstrated on 14 sorties, 4 with full scale ordnance.

FINDINGS

In surface preparation, the SRVT indicated that the AV–8A can be supported with existing USMC helicopter transportable equipment.

postulated in the concept of operations study were examined. Preliminary analysis

In logistics support, major support equipment and resupply requirements of the data indicates that the present logistical support systems within the USMC, both aerial and surface, are adequate to support the AV–8A and the concept of operations.

In communications, initial evaluation of the test results reveals that there

is no need for major changes to current communication doctrine and only minimal changes to the current MATCU T/O and T/E.

MARINE CORPS CONCLUSIONS

The results of the SRVT far exceeded all expectations and demonstrated the [deleted] effectiveness of the AV–8A. Furthermore, it proved the validity of the operational concept for employment of the AV–8A as an integral element of the Marine Air ground Team. Specifically the SRVT demonstrated:

That the AV–8A is capable of a sustained sortie rate in excess of 4.0 per day and can surge to a sortie rate in excess of 6.0 per day if required. The area of uncertainty identified by OSD was resolved by the results of the SRVT.

That the AV–8A is an adequate and flexible weapons system that can operate from austere facilities at remote sites and from existing hard-surfaced roads.

That the AV–8A is suitable for the mission for which it was procured and is capable of delivering ordnance on target with greater responsiveness because of its forward basing flexibility.

That the Marine Corps logistic system can provide the consumables required to support AV–8A operations from forward dispersed sites in addition to supporting a Main Base and a Facility.

That the Marine Air Command and Control System as presently constituted can accommodate AV–8A operations, including quick reaction operations from Forward Bases while maintaining centralized control of all tactical air assets.

That undesirable effects such as foreign object ingestion, hazard to ground crews from jet blast, erosion of surfaces from jet efflux and maintenance of the AV–8A in an expeditionary environment, which had been anticipated as possible problem areas, are not detrimental in AV–8A operations from austere bases.

Senator YOUNG. Is the fiscal year 1973 planned program contingent on the outcome of these tests?

Admiral MCCLELLAN. The outcome of the test is expected to influence the fiscal year 1973 procurement.

SUPPORT COST

Senator YOUNG. Of the total estimated cost of $120.3 million for these 30 aircraft, $17.7 million is for support costs. The fiscal year 1972 program, based on the same number of aircraft required only $12.3 million for these support costs. Comment on the major items included in the $17.7 million, and explain the reason for this large increase in support costs.

Admiral MCCLELLAN. The primary reasons for this increase is the necessity to procure additional ground support to support the Marines' detachment concept and the Navy's sea control ship. Both of these changes have greatly increased the number of sites which need support and therefore have impacted on the fiscal year 1973 support budget.

ADVANCE PROCUREMENT

Chairman ELLENDER. We discussed earlier a request of $7.1 million advance procurement to support the fiscal year 1974 procurement of the AV–8A. I assume this is to support the procurement of the 24 aircraft that will be required to complete the funding of the planned 114. Am I correct about this?

Admiral MCCLELLAN. That is correct, sir.

PLANNED PROGRAM

The Marine Corps now has one AV–8 squadron and the second squadron will be formed this year. The 30 AV–8A aircraft proposed for fiscal year 1973 procurement, along with the 60 previously authorized, are required to continue the orderly buildup of the Marine V/STOL program, provide for the third Marine AV–8 squadron and maintain Marine tactical aircraft force levels as the three F–4 squadrons which they replace are phased out.

A third AV–8A squadron, along with allowance for pipeline and attrition, is essential for support of the three Marine division-wing teams and permit deployment of this aircraft anywhere in the world Marines may be.

INITIAL SPARES

Chairman ELLENDER. As you indicated, your request includes $17.7 million for the procurement of initial spares for these 30 aircraft. I note on the data sheet that $8.1 million was provided for initial spares for the support of the 30 aircraft approved for fiscal year 1972. Just what accounts for the increase you are requesting when you are procuring the same number of aircraft?

Admiral MCCLELLAN. Ten spare engines will be procured in fiscal year 1973 which were not obtained in fiscal year 1972. The spare engine requirements are consistent with the criteria established by the Department of Defense, and this procurement makes up the difference in support costs between the two fiscal years.

The other categories of initial spares are essentially constant in both years, since site outfitting requirements remain fairly stable.

ENGINE

Chairman ELLENDER. On page 2 of the data sheet, under the performance information, I note the following statement: "Not demonstrated, since the F402–RR–401 engine is not yet available." Does this mean that these nine aircraft that we now have are not equipped with the specific engine intended for these aircraft?

Admiral MCCLELLAN. Ten of the original 12 aircraft procured in fiscal year 1970 were equipped with the F402–RR–400 engine, which produced 20,500 pounds of thrust. One of these aircraft was lost. The F402–RR–401 engine, which produces 21,500 pounds of thrust, is being installed in the last two aircraft of the fiscal year 1970 buy. The predicted performance on the data sheet is predicated on the increased thrust provided by the F402–RR–401 engine.

Chairman ELLENDER. Will it be necessary to refit these nine aircraft with this new engine?

Admiral MCCLELLAN. All of our engines will be raised to the 401 standard within the next year. The change from the 400 to the 401 will be accomplished by incorporating the parts provided by a change kit.

Chairman ELLENDER. When will we get the first aircraft with this new engine installed?

Admiral MCCLELLAN. The first aircraft equipped with the F402–RR–401 engine should be delivered by the end of this month.

EFFECT OF REEVALUATION OF BRITISH POUND

Senator YOUNG. Earlier, we discussed the increase in the cost of this program of $28.9 million resulting from the devaluation of the dollar relative to the British pound. As I understand the information on page 4 of the data sheet, the original planning estimate for these 114 aircraft was $503.6 million, and the current estimate for these 114 aircraft is $519.7 million. Am I correct about this?

Admiral MCCLELLAN. Yes, sir, that is correct.

FLYAWAY COST

Senator YOUNG. I note on the aircraft cost analysis sheet that the flyaway cost of this aircraft increases from approximately $2.9 million for fiscal year 1972 to $3.4 million for fiscal year 1973. Comment on this increase, and especially the increases in the cost of the airframe and the engines.

Admiral MCCLELLAN. The combination of inflation and the devaluation of the dollar has caused a general increase of 10–12 percent in each aircraft component area. The airframe cost increased by 12.2 percent and the engine by 11.4 percent. Engine accessories, electronics, armament and other Government furnished equipment all increased by 10.6 percent. The change allowance line showed the greatest increase—15.9 percent, but this is to be expected since we are incorporating 17 changes that improve the quality of the aircraft for U.S. Marine Corps operations.

F–14A TOMCAT FIGHTER AIRCRAFT

Chairman ELLENDER. If there are no further questions on the Harrier, we will proceed with the consideration of the F–14A Tomcat fighter aircraft. The F–14A aircraft data sheet will be included in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATES—AIRCRAFT DATA SHEET

Service: Navy—Nomenclature: F–14A; P–1 Line Item: *10, 11;* Popular Name: *TOMCAT*

Description/Mission:—The F–14A is a high performance, air superiority/fleet air defense fighter capable of air-to-air combat and air-to-surface attack missions. It is a two-place, tandem seat, variable sweep wing, supersonic, carrier-based airborne weapon system designed to replace the F–4 in naval fighter and fleet air defense roles in the 1973–1980 time period. The F–14 will have visual attack and all-weather capability to deliver PHOENIX and SPARROW missiles using a modified AN/AWG–9 weapon control system. It will also employ an M–61 gun and SIDEWINDER missiles for close-in air-to-air combat. Titanium is being used to minimize weight. Development was premised on maximum use of previously developed avionics hardware to limit risk and cost. The F–14A is powered by twin TF30–P–412 engines (Modified TF30–P–12 developed for other aircraft programs). F401–PW–400 (F–14B) engine development is continuing jointly with the Air Force F100–PW–100 F–15 engine.

COST DATA

[In millions of dollars] [1]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate total program
Procurement:										
Quantity	12.0	26.0	48.0	48.0	88.0	91.0				313.0
Cost		552.9	660.4	492.6	808.0	807.0				3,320.8
Less: advance procurement prior year		−9.5	−59.6	−84.8	−75.7	−75.8				−305.4
Net current year program		543.4	600.8	407.8	732.3	731.2				3,015.4
Plus: Advance procurement current year	+9.5	+59.6	+84.8	−75.7	+75.8					+305.4
Procurement unit cost		21.3	13.8	10.3	9.2	8.9				11.0
Weapon system cost	9.5	603.0	685.6	483.5	808.1	731.2				3,320.8
Initial spares		83.2	116.0	86.6	109.0	89.0				483.8
R.D.T. & E	688.5	344.1	228.3	162.6	39.7					[2] 1,463.2
MILCON		3.0		2.2						5.2
Program acquisition cost	698.0	1,033.3	1,029.9	734.9	956.8	820.1				5,273.0
Program unit cost										16.8
Total additional cost										102.8

[1] Certain figures are nonadd due to rounding.

[2] Includes $360,600,000 F–14B development costs.

Basis for FY 1973 Request.—48 F–14A aircraft are required to continue an orderly, least costly and earliest Initial Operational Capability (IOC) for this new Navy fighter. Adherence to the planned program will permit attainment of force levels approved in the Five Year Defense Program in the earliest possible time frame at the most cost-effective profile within the limits of the existing contract. The 48 aircraft are programed in accordance with the costs, schedule, and other terms of this contract.

Test Data:

(*a*) Start Navy Preliminary Evaluation (NPE)..... November 1971.
(*b*) Start NPE II..... June 1972.
(*c*) Start NPE III..... October 1972.
(*d*) Start Board of Inspection and Survey (BIS) trials... February 1973.

As of January 1972, 8 aircraft are in flight status and have flown 378.4 hours, 5 hours and 26 min. supersonic, in 166 flights. They have achieved 2.0 mach at 42,500 feet and a minimum 95 knots in the power approach configuration. NPE I commenced on 30 November 1971 and 2 aircraft flew 73.9 hours in 39 flights. The NPE I team investigated the total envelope available to them and reported 34 enhancing items that should be included in future aircraft designs, 27 deficiencies that should be corrected prior to NPE II, and 75 minor deficiencies recommended for correction before the BIS trials in February 1973.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	Grumman Aerospace Corp	Fixed price incentive.
Engine (F–14A)	United Aircraft Corp., Pratt & Whitney Division	Fixed price incentive, successive targe

	Classification	Requirement	Demonstrated
Performance:			
Speed/maximum/altitude	C	[Deleted]	Not demonstrated.
Radius combat, escort mission	C		Do.
Ceiling, supersonic	C		Do.
Characteristics:		F–14A:	
Empty weight (pounds)	U	36,921.1 lbs	
Normal takeoff weight	U	54,420 lbs	
Maximum takeoff weight (6 Phoenix)		66,339 lbs	
Length/height/span	U	62/16/64.1 ft	
Spotting factor (A–4C=1.0)	U	1.74	

Note: Characteristics shown in a configuration with 4 Sparrow missiles unless otherwise indicated.

FUNDED DELIVERY PERIOD

	End of fiscal year 1973
Inventory objective:	
Total operating aircraft	107
Other active aircraft	13
Total active aircraft	120
Inactive aircraft	3
Losses	11

PRODUCTION DATA

Fiscal year	Quantity	Deliveries: Fiscal year—															
		1971 and prior	1972: Quarter—				1973: Quarter—				1974: Quarter—				1975	1976	1977	1977, beyond
			1	2	3	4	1	2	3	4	1	2	3	4				
Procurement year:																		
1970 and prior	12	2	2	5	3													
1971	26				1	3	10	12										
1972	48								12	12	12	12						
1973	48												12	12	24			
1974	88														44	44		
1975	91															45	46	
1976																		
1977																		
Balance																		
Inventory losses (during year)		1								2				4	7	11	13	
Inventory (end of year)		1				15				59				103	164	242	275	

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	463	$5,192.0
R.D.T. & E.	6	974.0
Milcon		
Total	469	6,166.0
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	710	6,979.2
R.D.T. & E.	12	1,317.0
Milcon		5.0
Total	722	8,301.2
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	301	3,804.6
R.D.T. & E.	12	1,463.2
Milcon		5.2
Total	313	5,273.0

Difference between FY 1972 and FY 1973 submissions:

The reduced procurement program reflects the decision by the Deputy Secretary Defense to delete production F–14B aircraft from the approved program until F–401 engine development is nearer completion. Therefore, the number of F–14A's programmed has been increased from 54 a year ago to the present 301 aircraft. The increased RDT&E costs reflect increased development costs and schedule slippages associated with the development of the F–401 engine.

LOT V COST: CONTRACT PROBLEMS

Admiral MCCLELLAN. With your concurrence, I will not dwell on the recent disclosure that Grumman will seek a contract adjustment for future procurement of F–14's beyond the 86 now under firm orders. The Navy is currently assessing the total impact on the F–14 program. Upon completion of the assessment, we will present our recommendations for the Secretary of Defense and the Congress to consider.

Chairman ELLENDER. I understood from Mr. Laird that he intends to have the Grumman Corporation carry out its contract on lot V. Are you in doubt that that will be done?

Admiral WEISNER. Our doubt, Mr. Chairman, is that the contractor has advised that he is unwilling to manufacture lot V and subsequent under the terms that are currently in the contract. Therefore, it is safe to say that we have a problem on our hands that has not been solved.

The Secretary of Defense has said that at this time his position is that we have a contract with Grumman and that he intends to continue in that direction. The number of airplanes that have been manufactured so far, Mr. Chairman, represent a small number. Most of those were made, let us say, by hand. The manufacturer has not had much experience with the production line. Therefore, we do not know as much as we would like to know about the actual cost that it is going to take to manufacture this airplane.

Chairman ELLENDER. As I understood, you have a firm contract with Grumman for the manufacture of so many aircraft at a given price.

Admiral WEISNER. That is correct, Mr. Chairman.

Chairman ELLENDER. I understood that the Grumman Co. would probably try to force to Government to make a new contract, which would increase the cost of this plane considerably. If that contract is not revised, it means that Grumman may go broke.

Admiral WEISNER. That is one of the possibilities, Mr. Chairman.

Some of the things that we are not 100 percent sure of at the moment is how much money are they going to lose; will they in fact go broke; can we go forward on the present contract; all we know is that the company has said that it cannot.

If we cannot go forward on the contract, what action do we take? Do we take legal action against the contractor? Should they be provided relief under the ASPR regulations or should there be a restructuring of the contract?

PRODUCTION AT CONTRACT COST OF LOTS 1, 2, 3 AND 4

Chairman ELLENDER. I notice you have 74 aircraft funded but undelivered. Do you anticipate any trouble in respect to those?

Admiral WEISNER. No, sir. The Grumman Co. has advised, Mr. Chairman, that they will produce the aircraft from lots I through IV which totals 86 airplanes under the terms of the present contract.

Additionally, sir, they have said, as you have already remarked, that they are unable to produce lot V under the terms of the present contract.

CONTRACTOR PRODUCTION OF OTHER AIRCRAFT

Senator YOUNG. They are also building the A–6?

Admiral WEISNER. They build the A–6E, the EA–6B, and the E–2C.

Senator YOUNG. Are these relatively new contracts on the A–6E?

Admiral WEISNER. These are contracts that are let, from year to year as differentiated from the contract for the F–14 which was signed early in 1969. The F–14 contract was drawn up in the early part of 1968, and continues over the full span of procurement through lot VII.

Admiral McClellan can address the contracting features in greater detail, if you would like, Senator Young.

Senator YOUNG. I was interested in the new contract.

Are the inflationary costs included?

Admiral MCCLELLAN. The contracts for all the other aircraft built at Grumman other than the F–14 are on an annual basis. As we get the authorization and appropriation each year, we negotiate and sign a contract for that year's buy. Therefore, the effects of inflation are considered as they occur each year.

Senator YOUNG. The F–14 contract was in some respects one of the last contracts of the C–5A type.

Admiral MCCLELLAN. The F–14 contract is a multi-year contract as was the C–5A. There are six differences between these contracts. However, they both share the problem of attempting to project the economy over a large number of years. In the case of the F–14, over eight lots, or eight years.

LOT 5 PROCUREMENT

Admiral WEISNER. If I were to sum up this particular item, Mr. Chairman, I would say that until such time as the issue is resolved, we are proceeding with our planning in accordance with the terms of the present contract. Prior to the commitment of funds which the contract requires on October 1, we should have much more data for

a decision, such regarding the number of man-hours required to manufacture the airplane.

We certainly will advise the Department of Defense and the Congress before making the final commitment on the buy.

AIRCRAFT PHOENIX MISSILE PRODUCTION AND CAPABILITY

Chairman ELLENDER. Do you proposed to proceed with the production of the Phoenix missile which is to be used in the F–14?

Admiral WEISNER. Yes, sir. We have Phoenix missiles presently in production and that is an item that will be covered in detail later here this morning, sir.

Chairman ELLENDER. I am told that the ability to carry the Phoenix missile is what makes this aircraft so valuable to us.

Admiral WEISNER. That is correct, Mr. Chairman. This airplane is designed for fleet air defense as well as a straight air superiority fighter, the dogfight mission, if you like.

The Phoenix missile system is what gives the F–14 the capability at great ranges against multiple targets and at high altitude. We do not have a reasonable capability in other aircraft, sir.

COMPARISON OF EXISTING AND FUTURE AIRCRAFT COSTS

Chairman ELLENDER. What will be the average cost of the F–14 under the terms of the contract?

Admiral WEISNER. Yes, sir. I will give you, in just one moment, the average cost of the airplanes so far.

Admiral MCCLELLAN. The flyaway cost for the F–14 in the 1973 budget is $8.52 million. The total program cost for those airplanes, procurement cost, rather, and not program, is $10.26 million. The overall program cost for the F–14, based on the existing contract, is $16.8 million each.

Admiral WEISNER. Now in further answer, Mr. Chairman, future unit cost of the airplane, the cost to complete under the terms of the present contract from now on, is $9.9 million per airplane.

Chairman ELLENDER. The additional cost?

Admiral WEISNER. If the contractor, of course, says, and it turns out that he is correct, that it will cost more, that will be above this $9.9 million.

Chairman ELLENDER. You mentioned a figure of $16 million. What does that include?

Admiral WEISNER. $16.8 million is the total program cost, R. & D., everything involved, sir.

Chairman ELLENDER. You include R. & D. in the cost of the plane, don't you?

Admiral WEISNER. It depends in what context you are talking of the cost. Sometimes they address it flyaway; other times procurement in the PAMN account. But the total procurement cost under the present contract for 313 airplanes, which is a relatively small number of airplanes, is $16.8 million.

Senator YOUNG. This does not include the Phoenix missile?

Admiral WEISNER. It includes the fire control system in the airplane, the AWG–9 system which gives the airplane the capability with the Phoenix missile. It does not include the missile round itself.

PHOENIX MISSILE COST

Senator YOUNG. How much additional does the Phoenix missile cost?

Admiral WEISNER. The Phoenix missile we will come to, Senator Young, in a moment. The missile, itself, is going to be on the order of [deleted].

Senator YOUNG. How many does it carry?

Admiral WEISNER. It can carry six Phoenix missiles as well as Sparrow and Sidewinder missiles.

POSSIBLE CONGRESSIONAL OPPOSITION: AIRCRAFT CAPABILITY AND MISSIONS

Chairman ELLENDER. I fear we may have some difficulty with this request when the bill is on the Senate floor. I would advise you to make the best case for it that you can, particularly if they are as necessary as you have indicated.

Admiral WEISNER. We certainly think the airplane is vital, Mr. Chairman. We think it is demonstrating its capabilities in a splendid manner at this time. It is, we acknowledge, an expensive system, unfortunately as are so many of our others.

We certainly will take your advice, sir, and try to make the best case possible.

Chairman ELLENDER. What do you anticipate in the future that would make the procurement of this aircraft so vital?

Admiral WEISNER. We feel, Senator, one, that we need the airplane to deal with the existing capabilities of potential enemies as far as altitude is concerned. This is the only airplane with the Phoenix missile that can deal in a realistic manner with the Foxbat at altitude, for example.

As far as the fleet air defense role is concerned, we feel that we must have an airplane that cannot only cope with potential enemy airplanes but also can cope with cruise missiles.

This airplane, in the evaluations we have done so far, has a very good capability against air-to surface and surface-to-surface missiles.

Chairman ELLENDER. Proceed.

SEA CONTROL AND AIR SUPERIORITY OVER LAND OBJECTIVE AREAS

Admiral WEISNER. The capabilities embodied in the F–14 are vital to the Navy if we are to retain the ability to maintain control of the sea and, when necessary, to project air superiority over land objective areas.

The advancing Soviet capability which confronts our naval forces and our country is formidable, both in scope and number. Moreover, this problem grows daily as Soviet investment in military technology reaches the dividend stage while our investment declines.

The F–14A is a balanced weapons system employing the AWG–9 radar in conjunction with the long-range, multishot Phoenix missile (AIM–54), the medium-range Sparrow (AIM–7), the close-in Sidewinder (AIM–9), [deleted], and the M–61 20 mm. Vulcan cannon.

As a system, the F–14 was designed specifically for superiority over the individual and total aerial threat through the 1980's.

First and foremost, the F–14, from its inception, has been molded as an air superiority fighter. This is not to say that this will be its most important mission but, rather, that this capability is the single most demanding airframe/system design consideration.

Once established, this capability can be expanded into the Fleet Air Defense role and, if needed, interdiction. The reverse design philosophy is not true.

The F–14A's weapons system, the AWG–9, boasts its own uniqueness as the most sophisticated and capable air-to-air system ever carried in a fighter aircraft.

Its advantages included expanded envelopes for today's missiles, simultaneous search and track of numerous targets, and, coupled with the Phoenix missile, an extreme long-range, multi-shot attack capability against both aircraft and cruise missiles.

AWG–9/AIM–54 performance has been verified . . . to date, 43 missiles have been launched and unprecedented results have been achieved against the spectrum of threat representations.

Combat With Russian Foxbat

Chairman Ellender. Admiral, you said this plane is most necessary for us if we are to maintain control of the seas. You previously stated that this was probably the only plane that could counter the Foxbat.

Admiral Weisner. That is correct.

Chairman Ellender. How could the Foxbat be used in the Pacific?

Admiral Weisner. The Foxbat in the Pacific could easily be used in the Sea of Japan. It could reach out in certain other areas.

Chairman Ellender. How would this be done?

Admiral Weisner. It is not an exceedingly long-range airplane but it can be used to fly rescue missions or carry an air-to-surface missile, for example.

Chairman Ellender. How far out could it fly?

Admiral Weisner. [Deleted] miles, sir, on its longer range mission.

Sea Control Capability

Chairman Ellender. We will be protecting the seas for whom, Japan?

Admiral Weisner. Japan would be protected as far as the sea of Japan; perhaps Korea. When I refer to the control of the seas, I am not referring there to the Foxbat. I am referring primarily to the missiles.

Chairman Ellender. You say this missile is necessary to combat the Foxbat and you further state that it is necessary for us to have control of the seas.

Admiral Weisner. Yes, sir.

Chairman Ellender. In what areas?

Admiral Weisner. I think we have to have control of the sea lines, Senator. Certainly in the Atlantic and certainly in the Pacific, as far as keeping a flow of supplies to and from this country and our allies. I did not mean to imply——

Chairman Ellender. Do you anticipate the United States will re-

main in Southeast Asia indefinitely? I thought we were planning to remove our forces from Southeast Asia.

Admiral WEISNER. Mr. Chairman, I agree with you; I hope we get out of Southeast Asia.

Chairman ELLENDER. We ought to immediately.

Admiral WEISNER. I agree, we want the South Vietnamese to take over their own show at the earliest possible time.

Chairman ELLENDER. Off the record.

(Discussion off the record.)

TESTS, EVALUATIONS AND FLIGHT TEST DEMONSTRATIONS

Admiral WEISNER. The F–14 testing continued in earnest during 1971. The aircraft has met or exceeded both specification guarantees and Navy predictions. For instance, escort radius, on internal fuel only, is 20 percent better than specified. The high point of the year was the F–14's initial evaluation by Navy pilots which took place in December. During eight flying days, 39 sorties and 74 hours were logged, including four flights on one aircraft in the same day.

Presently, eight aircraft have flown over 430 hours in the test program.

Actually, we have now flown No. 9. We have nine airplanes flying in the program at the present time.

Four F–14's are at Point Mugu, Calif., for installation and testing of the AWG–9 weapons systems.

Actual flight test comparisons with the F–4 have demonstrated that the F–14A:

Needs only one-half the take-off distance;

Has a 30 percent lower fuel flow at cruise speeds;

Is more stable with SAS (stability augmentation system) off than the F–4 with SAS on:

Is more than 100 knots faster and 2 miles ahead after side-by-side acceleration to 1.8 times the speed of sound:

Has approach speeds 25–30 knots lower; and

Require less than one-half the landing distance.

Navy pilots flying the F–14 have conducted simulated dogflights against Navy piloted F–4's and using military power alone, easily defeated the F–4 in one of two turns.

These large increases in mission performance combined with low maintenance man-hours per flight hour promise significantly improved combat effectiveness to the fleet.

PLANNED PROGRAM AND 1973 FUNDING

To date, 12 research and development aircraft and 74 production aircraft have been funded. The remaining 227 are planned for procurement in fiscal year 1973 and subsequent years.

The fiscal year 1973 request of $483.5 million provides for procurement of 48 F–14A aircraft, the minimum procurement possible without abrogating the existing multi-year contract. An additonal $86.6 million is required for initial spares.

Chairman ELLENDER. Let me be sure that I undersand your request. The 48 aircraft figure is based on a cost of $492.6 million which is offset by advance procurement provided in fiscal year 1972 in the amount of $84.8 million for a net requirement for these 48 aircraft of $407.8 million. And in addition, you are requesting $75.7 million for advance procurement to support the planned 1974 procurement program. It is the sum of these two that gives you the $483.5 million. Am I correct about this?

Admiral MCCLELLAN. Yes, that is correct.

DEVELOPMENT OF ADVANCED TECHNOLOGY ENGINE FOR F–14B

I would like to make one additional point regarding the F–14 program.

The Navy is continuing in the joint development of the advanced technology engine (ATE) which will be used in the F–14B. The present F–14A production program represents a position that can be modified to F–14 procurement when prudent to do so.

When sufficient ATE development information is available to establish a "fly before buy" phase-over to F–14B production, the issue of F–14A or F–14B will be reviewed and a final decision made.

Senator YOUNG. Does the Navy have plans to proceed with the more powerful engine to provide a greater capability?

Admiral WEISNER. Senator Young, as I am sure you know, the B engine is presently under development. We are watching it and participating fully in its development. When the engine has met its qualification test, we will consider going to the B engine in the airplane.

The F–14A gives us a splendid capability for the fleet air defense mission. The B engine with its increased 6,000 to 8,000 pounds of thrust will greatly enhance the capability of the airplane in a dogfight role.

So, yes; we are watching it carefully. We may very well go to the B engine.

FOXBAT COMPETITOR IMPERATIVE

Senator YOUNG. I am one who is convinced that we must have fighters with much more capability than we now have to meet the capability of the Foxbat. I am at a loss to understand why, even after we have once developed this plane, the Russians will still have a plane that can fly much higher and faster.

Maybe with the Phoenix missile—you know better than I do—we can compete with the Foxbat. But since we are developing a new plane, it seems to me that we should have had an aircraft that will fly as fast and as high as theirs.

Admiral WEISNER. I think the answer there, Senator Young, is that the combined weapons system, that is, the airframe with its AWG–9 system of Phoenix missile, is competitive and is superior to the Foxbat.

However, for certain conditions where you might get into a dogfight with other types of fighters that are being developed by potential enemies, the B engine will give you a considerable measure of increased capability.

B ENGINE CAPABILITIES AND ADAPTION TO AIRFRAME

Senator YOUNG. How much more speed would the new engine provide us?

Admiral WEISNER. The difference in speed will be very small. Admiral Feightner, would you like to address this?

Admiral FEIGHTNER. Yes, sir.

The B engine in the airplane gives us the increased acceleration that is required and the increased thrust to make tighter turns at higher altitudes.

We have done a considerable amount of study on this. The engine is required in the 1980 time frame in order to stay abreast of the other fighters that will be in various areas of the world at that time. In order to combat these new fighters that are on the boards now an aircraft on the order of the F–14B will be required for the close-in type of dogfight.

Senator YOUNG. Will you be able to put the B engine in the first order of F–14's?

Admiral FEIGHTNER. Yes, sir. They could be backfitted if we decided to do so.

Senator YOUNG. Are the frames strong enough?

Admiral FEIGHTNER. The airplane was designed from the beginning to house that particular engine. We modified the airplane in order to put the present engine in it, the original concept being that we would make them all with the B engine. However, the B engine development has slipped to such an extent that we decided it would be best to go ahead with the A engine at this time. The airplane is designed from the beginning with the idea of putting that particular engine in.

Chairman ELLENDER. There is a point I want to clear up. I was told that if we made a decision to go the B version of the F–14 instead of the A we would have to renegotiate the contract with Grumman. I was later told this was not true. My question is: If the Navy decides to go to the F–14B, will you have to renegotiate the contract?

Admiral WEISNER. Not necessarily, Mr. Chairman.

Admiral MCCLELLAN. Mr. Chairman, provided we buy the minimum number of aircraft specified in the contract, for this year it is 48, it is contractually immaterial whether we buy As or Bs. If we were to reduce the number of aircraft below 48 in conjunction with changing from the A to the B, we would then break the contract by virtue of that reduced number, not because of our changing the type of engine.

Chairman ELLENDER. Would Grumman install the new engine without additional charges?

Admiral MCCLELLAN. We would have to negotiate with Grumman the increased cost of changing the production line to put the new engine in. That price is not now negotiated.

Chairman ELLENDER. That can be done under the existing contract?

Admiral MCCLELLAN. Yes, sir. It would be done within the framework of the existing contract on the basis of a cost that they would justify.

OPTION IMPLEMENTATION

Chairman ELLENDER. As I understand the data set out in the fiscal year 1973 column of the aircraft data sheet, it is based on implementation of the option for the procurement of lot 5 under the existing contract terms. Is this correct?

Admiral MCCLELLAN. Yes, that is correct.

F-14 FUNDING

Chairman ELLENDER. As we indicated earlier, the budget request is based on these 48 aircraft at a total estimated cost of $492.6 million. The 48 aircraft funded in fiscal year 1972 were based on an estimated cost of $660.4 million. I assume this projected decrease in the estimated cost of these aircraft is the result of being further along in the production program. I believe you people refer to it as the learning curve. Am I correct about this?

Admiral MCCLELLAN. Part of the decrease is attributable to the production learning curve. The balance of the decrease can be traced to a reduction in support costs. Support costs are reduced in fiscal year 1973 in that we expect to outfit fewer maintenance support sites in fiscal year 1973 than in fiscal year 1972.

1974 PLANNED PROGRAM

Senator YOUNG. Earlier, we referred to the $75.7 million included in the 1973 request for advance procurement to support the planned 1974 procurement program. How many aircraft are in your planned program for fiscal year 1974?

Admiral MCCLELLAN. There are 88 aircraft in our planned program for fiscal year 1974.

Senator YOUNG. When will this $75.7 million be obligated under the terms of the existing contract, and what will the funds be obligated for?

Admiral MCCLELLAN. We plan to obligate these funds prior to the beginning of fiscal year 1974 for the procurement of long leadtime production material.

INITIAL SPARES

Chairman ELLENDER. Just how did you compute the requirement for $86.6 million for initial spares for the support of these 48 aircraft?

Admiral MCCLELLAN. I will be happy to furnish that.

(The requested information follows.)

The procedures and methodology described in the A-6 Insert for the Record on initial spares computation are applicable to all initial spares computations including F-14 requirements. (See page 686.)

MILITARY CONSTRUCTION

Chairman ELLENDER. On the data sheet, I note an entry of $2.2 million for military construction. What does this involve?

Admiral McCLELLAN. The $2.2 million is required for the construction of aircraft systems training buildings at Naval Air Stations, Miramar and Oceana. This requirement has subsequently been reduced to $726,000 as a result of deletion of the second increment of maintenance training at NAS Miramar.

FLYAWAY COST

Chairman ELLENDER. Of the total estimated cost of $492.6 million for these 48 aircraft, I note that $408.7 million is for the flyaway cost, which equates to approximately $8.5 million per aircraft flyaway cost. How does this compare to the flyaway cost of the 1972 program?

Admiral McCLELLAN. Unit flyaway cost for the fiscal year 1972 program is approximately $10.4 million. Unit flyaway cost is expected to decrease by approximately $1.9 million in fiscal year 1973.

SUPPORT COST

Senator YOUNG. The balance of the fiscal year 1973 estimated cost of $83 million is for the various support costs. $162.6 million was required for these support costs in fiscal year 1972 when we were procuring the same number of aircraft. Just why do we have this tremendous decrease in the support costs of this aircraft?

Admiral McCLELLAN. We are projecting this support decrease because we expect to outfit fewer maintenance support sites in fiscal year 1973 than in fiscal year 1972.

UNIT APPORTIONMENT OF R. & D. EXPENSES

Senator YOUNG. Earlier, we discussed the various costs for the F–14 aircraft. I call your attention to the cost history information on page 4 of the aircraft data sheet. There, it is indicated that the original planning estimate was based on a total estimated cost of $6,166 million based on the production of 469 aircraft which gives a unit program acquisition cost of approximately $13.1 million, which includes approximately $2.1 million for the estimated cost of R. & D. allocated to the total number of aircraft. Do you agree with this analysis of this information?

Admiral McCLELLAN. Yes. As you know, R. & D. expenses are essentially fixed. Therefore, the unit apportionment of R. & D. expenses is a function of the quantity of aircraft procured.

Senator YOUNG. Now, let us look at the estimate on which the 1972 budget was based. Here, the total estimated program acquisition cost was $8,301.2 million, but on the production of 722 aircraft, which gives a unit program acquisition cost of approximately $11.5 million per aircraft, which includes approximately $1.8 million for R. & D. when this cost is allocated to the 722 aircraft. Do you agree with my calculations here?

Admiral McCLELLAN. Yes. The greater the number of aircraft over which to spread total R. & D. cost the lesser the unit R. & D. cost. In

addition, unit cost will fall at larger program quantities as a result of learning curve improvement and economies of scale.

Senator YOUNG. Now, the current estimate is based on a total estimated cost of $5,273 million for the production of 313 aircraft, which gives a unit program acquisition cost of $16.8 million, which includes approximately $4.7 million R. & D. when the total R. & D. cost is allocated to the 313 aircraft. My point is simply this: When the total number of aircraft to be produced was reduced from 722 to 313, and the unit program acquisition cost increased from $11.5 million to $16.8 million, it must be remembered that the cost of R. & D. has to be spread over fewer aircraft. Do you agree with my analysis of this information?

Admiral MCCLELLAN. I agree completely.

VH–53D EXECUTIVE HELICOPTER

Chairman ELLENDER. If there are no further questions on the F–14A, we will proceed with the consideration of the request of $30.1 million for the procurement of six VH–53D executive helicopters. The aircraft data sheet will be included in the record at this point.

Admiral MCCLELLAN. I will be happy to provide that for the record.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—AIRCRAFT DATA SHEET

Service: Navy—Nomenclature: VH–53D Executive Helicopter; P–1 Line Item No. 14; Popular Name: Sea Stallion

Description/Mission.—The VH–53D helicopter is a version of the Marine Corps CH–53D and the Navy RH–53D aircraft produced in FY 1972 and prior years. Marine Corps CH–53's, operating from White House and auxiliary helicopter pads, have participated frequently in White House support flights. The high speed H–53 is currently in production and is capable of being modified to satisfy executive mission requirements. These requirements include increased passive protection, increased capacity for staff facilities, flexibility of arrangements, passenger comfort, and ability to serve as a fast, safe, transport for intermediate distances. The cost of these modifications is included in the amount budgeted for FY 1973.

COST DATA

[In millions of dollars]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate total program
Procurement:										
Quantity				6						6
Cost				30.1						30.1
Less: Advance procurement prior year										
Net current year program				30.1						30.1
Plus: Advance procurement current year										
Procurement unit cost				5.0						5.0
Weapon system cost				30.1						30.1
Initial spares				6.9						6.9
R.D.T. & E										
Milcon										
Program acquisition cost				37.0						37.0
Program unit cost										6.2
Total additional cost										

Basis for FY 1973 Budget Request.—Since the existing VH–3A executive mission helicopters will reach the end of their mission service life during the FY 1973 funded delivery period, 6 VH–53D's are requested to provide continued safe and secure transport for the President.

Test Data:

(*a*) Navy Preliminary Evaluation (NPE) ---------- May 1974.

(*b*) Board of Inspection and Survey Trials (BIS) ------ July–August 1974

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	United Aircraft Corp., Sikorsky Aircraft Division	Initial procurement.
Engine	General Electric Co	Fixed price redeterminable.

	Classification	Demonstrated
Characteristics:		
Cruise speed	U	130 knots.
Mission time	U	4 hours
Crew	U	3.
Passengers	U	28.
Gross weight	U	42,000 pounbs.
Height	U	17.14 feet.
Length	U	88.2 feet.
Main rotor diameter	U	72.23 feet.
Tail rotor diameter	U	16 feet.
Engine	U	T64–GE–414.

END OF FISCAL YEAR 1973 FUNDED DELIVERY PERIOD

Inventory objective/requirements:	
Total operating aircraft	6
Other active aircraft	
Total active aircraft	6
Inactive aircraft	
Losses	

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	6	$37.0
R.D.T. & E		
Milcon		
Total program costs	6	37.0
Current estimate total program (fiscal year 1972 budget submission):		
Procurement		
R.D.T. & E	(1)	(1)
Milcon		
Total program costs		
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	6	37.0
R.D.T. & E		
Milcon		
Total program costs	6	37.0

[1] Not applicable.

Difference between FY 1972 and FY 1973 submissions:

The FY 1973 buy is the only planned procurement of this helicopter and was not approved at the time of the FY 1972 submission.

Admiral WEISNER. The VH–53D is an executive version of the Marine Corps CH–53D and Navy RH–53D aircraft. It will replace the existing executive mission VH–3A helicopters which will reach the end of their mission service life during calendar year 1975.

UTILIZATION OF REPLACED AIRCRAFT

The H–53 helicopter is an in-service, in-production high-speed helicopter capable of being modified to satisfy Presidential mission requirements. These requirements include increased passenger protection, advanced avionics, increased capacity for staff facilities, passenger comfort and flexibility of internal arrangements.

The replaced VH–3's will be transferred to fleet support squadrons to utilize their remaining service life. $30.1 million is requested to procure six VH–53D helicopters. An additional $6.9 million is required for initial spares.

PRESIDENTIAL MISSION REQUIREMENTS

Chairman ELLENDER. Explain the reference to "Presidential mission requirements."

Admiral WEISNER. These are being procured as an executive helicopter to be used here in the Washington area and other areas, when required, for the use of the President, sir.

Chairman ELLENDER. What is this Presidential requirement? He has one of the finest helicopters I ever saw. I saw it conveying him to the White House when he arrived from China. Is that the helicopter?

Admiral WEISNER. It is for that type of use, Mr. Chairman.

Admiral MCCLELLAN. Mr. Chairman, the one you saw is a VH–3. These are indeed fine aircraft. They will, however, have reached the end of their service life of 5,000 hours prior to the delivery of the VH–53 aircraft requested in this budget. These are replacement aircraft of greater capability than the existing VH–3 aircraft.

Chairman ELLENDER. How many helicopters are there at the President's disposal?

Admiral WEISNER. Six VH–3's. These six will replace those six aircraft.

Chairman ELLENDER. Are those used exclusively for Presidential conveyance?

General HILL. No, sir, Mr. Chairman. This is a primary purpose but they are also based in Washington, Quantico, and Fort Belvoir area to be used for emergency, high priority evacuation of the President's staff, and other governmental officials.

Chairman ELLENDER. This request has no relationship to the requirement for airplanes for the airborne command post, does it?

General HILL. No, sir; except in evacuation in the event of an alert or emergency.

Chairman ELLENDER. I am told that if anything should happen, high ranking officials will proceed to a protected area.

Admiral WEISNER. It is a good airplane to take one there, Mr. Chairman.

Chairman ELLENDER. I don't think it will ever be used for that purpose.

Admiral WEISNER. I hope you are right.

Chairman ELLENDER. I am confident this will never happen.

DELIVERY SCHEDULE

Senator YOUNG. I have one more question. When would these be delivered and placed in inventory?

Admiral MCCLELLAN. They will be delivered in the calendar year 1974, the first aircraft in July and one a month thereafter, sir.

EFFECT OF FLYING HOURS ON AIRCRAFT

Senator YOUNG. The ones you have now have a lot of flying hours on them, you say?

Admiral MCCLELLAN. Yes, sir. They are projected to reach 5,000 hours on their airframe by the time these are delivered and therefore they will be phased out of this mission.

Senator YOUNG. What are some of the problems that arise in a helicopter when it has flown 5,000 hours or more?

Admiral MCCLELLAN. The hours are a measure of the fatigue life and other wear on the airframe and dynamic components, Mr. Young. We are especially careful, of course, in aircraft assigned to this mission to be sure that we do not have failures.

The helicopter is an airplane that inherently vibrates more than other airplanes; all the elements of fatigue are more critical in helicopters than they are in fixed wing aircraft.

Senator YOUNG. I think it is amazing with all the hours that the Members of Congress and the President have flown all over the world—we should knock on wood—and no life has been lost. I remember former Senator Lundeen, of Minnesota, was killed in an air crash, but I believe that was a private plane.

Admiral MCCLELLAN. I hope we maintain that record.

Senator YOUNG. I think that is amazing.

UTILIZATION OF PRESENT AIRCRAFT

Chairman ELLENDER. What are you going to do with these planes that you now have on hand?

General HILL. Mr. Chairman, these aircraft will stay in our helicopter squadrons down at Quantico.

Chairman ELLENDER. For what purpose?

General HILL. They will be used in conjunction with administrative purposes in support of the Marine Corps development and education command. The heavy configuration required for the Presidential mission in them can be taken out and they can be used for troop support and logistical movements.

Chairman ELLENDER. If they will be used for that purpose, why can't they be continued in their present service? The life of a marine

there is as sacred as that of a Congressman, Senator or anybody else. Why would you use them there, but not continue their present use?

General HILL. They will have very little service life left in them after fiscal year 1975.

Chairman ELLENDER. You propose to use them at Quantico?

General HILL. The restrictions and requirements for the aircraft for the President are much stricter than they are for other missions.

Chairman ELLENDER. The life of a marine, the life of a general, the life of a Senator is as dear to him as the life of the President.

Senator YOUNG. One life is as dear as the other.

Chairman ELLENDER. This request is for $37 million?

Admiral WEISNER. That is correct, sir.

TOTAL AND FLYAWAY COSTS

Chairman ELLENDER. This total estimated cost of $37 million includes $30.1 million for the procurement of the aircraft and $6.9 million for the procurement of the required initial spares. Is this correct?

Admiral MCCLELLAN. Yes.

Chairman ELLENDER. How much of the $30.1 million is required for the flyaway cost of these helicopters?

Admiral MCCLELLAN. $26.2 million.

SUPPORT COST

Senator YOUNG. Just what is included in the $3.9 million that is required for support cost for these helicopters?

Admiral MCCLELLAN. The $3.9 million for support costs includes the following: Airframe support equipment, $720,000; engine support equipment, $1.6 million; avionics support equipment, $630,000; publications, $545,000; training support, $100,000; and technical services, $325,000.

UH–1N IROQUOIS HELICOPTER

Chairman ELLENDER. If there are no further questions on the VH–53D, we will proceed with consideration of the request of $19.1 million for the procurement of Iroquois helicopters. The aircraft data sheet will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—AIRCRAFT DATA SHEET

Service Navy—Nomenclature UH–1N Utility Helicopter

P–1 Line Item No. 15, 16: Popular Name: *Iroquois.*

Description/Mission.—The UH–1N is a versatile helicopter whose primary missions are command and control, troop transport, medical evacuation and courier liaison. Alternate missions are movement of cargo and equipment in amphibious assault and subsequent operations ashore, local base rescue, light vertical replenishment, and search and rescue. The UH–1N version of the combat-proven UH–1 Iroquois incorporates a twin-engine power package which increases mission reliability, payload, flight safety, and growth potential over its single engine predecessors.

COST DATA

[In millions of dollars]

	Fiscal year—								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity	62	15	24	24	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]
Cost	35.4	14.1	18.5	21.7	21.5	22.6	23.6	18.8	46.9	223.1
Less: Advance procurement prior year		−.4	−2.0	−2.6	−1.3	−1.3	−1.4	−1.2	−1.2	−11.4
Net current year program	35.4	13.7	16.5	19.1	20.2	21.3	22.2	17.6	45.7	211.7
Plus: Advance procurement current year	+.4	+2.0	+2.6	+1.3	+1.3	+1.4	+1.2		+1.2	+11.4
Procurement unit cost	.6	.9	.8	.9	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]
Weapon system cost	35.8	15.7	19.1	20.4	21.5	22.7	23.4	17.6	46.9	223.1
Initial spares	5.4	1.0	1.6	1.8	1.5	2.3	1.5	1.6	4.0	20.7
R.D.T. & E.										
Milcon										
Program acquisition cost	41.2	16.7	20.7	22.2	23.0	25.0	24.9	19.2	50.9	243.8
Program unit cost										[Deleted]
Total additional cost	1.0	1.5	1.5	.9						4.9

Basis for FY 1973 Budget Request.—Marine Corps UH–1N's will ultimately be deployed in [deleted] squadrons performing those tasks associated with Marine amphibious assault and operations ashore. The FY 1973 program will provide an increment toward this objective. Through FY 1972, 61 aircraft have been provided for the Marines and 40 for the Navy. The total program quantity includes Navy aircraft, and repair pipeline and attrition aircraft, as well as aircraft for the Marines.

Test Data:

(*a*) Acceptance first production aircraft ..... February 1971
(*b*) Navy armament qualification tests completed ..... December 1971
(*c*) Final Board of Inspection and Survey report ..... June 1972

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	Bell Helicopter Co	Fixed price incentive.
Engine	United Aircraft of West Virginia	Firm fixed price.

	Classification	Operational requirement	Demonstrated
Performance:			
Hover ceiling, hot day	U	5,500 ft	Air Force testing to be completed in February 1972.
Single engine rate of climb (sea level—103).	U	25.0 ft. per minute	
Radius with 30-minute loiter	U	80 nautical miles	
T400–CP–400 twin-pac engine	U	Full military qualification (150-hr. test).	Full military qualification successfully demonstrated.
Characteristics:			
Maximum takeoff weight	U	10,000 lbs	
Overall length	U	57 ft	
Fuselage length/rotor diameter	U	43 ft./48 ft	
Combat speed/altitude/gross weight.	U	105 knots/sea level/10,000 lbs	
Maximum speed/altitude/gross weight.	U	134 knots/sea level/8,000 lbs	
Crew	U	3	
Ordnance	U	2 pintle-mounted M–60D/50 caliber machine guns.	

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	103	$67.1
R.D.T. & E		
Milcon		
Total program costs	103	67.1
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	[Deleted.]	238.5
R.D.T. & E		
Milcon		
Total program costs	[Deleted].	238.5
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	[Deleted.]	243.8
R.D.T. & E		
Milcon		
Total program costs	[Deleted.]	243.8

Difference between FY 1972 and FY 1973 submissions:

The current estimate for [deleted] UH–1N aircraft is $5.3 million higher than the FY 1972 submission. This increase is attributed to a reduction in yearly procurement increments and consequent program stretch-out, and revised support requirements.

Admiral WEISNER. The UH–1N is the latest model of the famous Huey helicopter, incorporating design and equipment improvements that markedly improve safety, reliability and maintainability. The Navy, Marines and the Air Force all use this helicopter in similar configurations.

The Navy uses the UH–1N primarily for support of Operation Deepfreeze and for search and rescue missions at our naval air stations. The Marine Corps use includes command and control mobility for troop commander, and all weather movement of troops, equipment and cargo in amphibious assault and shore-based operations.

Other missions include medical evacuation, combat reconnaissance support and other light utility missions.

The Marine Corps force requirement is [deleted] HML squadrons of [deleted] operating aircraft each plus one training squadron. The Navy force level requirement is [deleted] operating aircraft.

PLANNED PROGRAM AND 1973 FUNDING

A total procurement program of [deleted] UH–1Ns is planned; 101 previously authorized, 24 requested this year and [deleted] planned for future years.

We are requesting $20.4 million to procure the 24–1Ns. $1.8 million is required for initial spares.

Senator YOUNG. Are the 24 helicopters you are requesting for fiscal year 1973 all for use by the Marine Corps?

Admiral WEISNER. Yes, sir; that is correct.

IROQUOIS FUNDING

Chairman ELLENDER. As I understand your request, these 24 helicopters will cost $21.7 million, which is offset by advance procurement in the amount of $2.6 million, leaving a net requirement of $19.1 million directly associated with these 24 helicopters. And in addition, you are requesting $1.3 million for advance procurement to support your planned procurement of these helicopters in fiscal year 1974. Am I correct about this?

Admiral MCCLELLAN. That is correct.

1974 PROCUREMENT

Chairman ELLENDER. How many helicopters are in your planned procurement for fiscal year 1974?

Admiral MCCLELLAN. There are [deleted] UH–1N helicopters in the planned procurement for fiscal year 1974.

ADVANCE PROCUREMENT

Chairman ELLENDER. When will this $1.3 million requested for advance procurement be obligated, and what items will be involved in this advance procurement program?

Admiral MCCLELLAN. It is planned that the $1.3 million will be obligated by March 31, 1973. The major portion, $858,000, of this amount covers the estimated cost of the advance procurement requirement for the T400–CP–400 engine. It is estimated that these funds will be obligated during August 1972. Other items included in the $1.3 million advance procurement are the ASN–43 compass, APN–171 radar altimeter, ARN–105 Tacan, ARN–89 automatic direction finder and the ARA–50 automatic direction finder.

TEST STATUS

Senator YOUNG. On page 2 of the data sheet, in connection with the performance data, under the heading "Demonstrated," I note the following statement: "Air Force testing to be completed in February 1972." What is the current status of these tests?

Admiral MCCLELLAN. The Air Force testing ended March 1, 1972. It appears that Navy contract performance guarantees will be met. The final report covering this testing is presently in preparation and is scheduled for distribution by May 31, 1972.

FLYAWAY COST

Chairman ELLENDER. How much of the $21.8 million estimate cost of these helicopters is flyaway cost?

Admiral MCCLELLAN. $19.9 million of the $21.8 million cost covers flyaway of the 24 UH–1N's.

SUPPORT COSTS

Chairman ELLENDER. Comment briefly on these various items included in the $1.9 million requested for support costs.

Admiral MCCLELLAN. Support requirements for the UH–1N consist of the following:

Airframe, engine and avionics peculiar ground support equipment totaling $679,000 consists of outfitting of three LHA's—intermediate vessel sites—and the updating of existing organizational and intermediate land sites.

We have included $375,000 for updating of the trainer, engineering change proposals and GFE for that effort.

We require $378,000 for revisions to publications and technical data to maintain these documents in a current status. This also includes printing and distribution of the foregoing.

We require $145,000 to cover continuing requirements for factory training of maintenance personnel and for training parts.

Funds in the amount of $310,000 will provide contractor technical services for the UH–1N fiscal year 1973 PAMN requirement. This covers 9 man-years of UH–1N technical service.

AH–1J ASSAULT HELICOPTER

Chairman ELLENDER. We will now proceed with the consideration of the request for $28.6 million for the procurement of the AH–1J assault helicopter. The aircraft data sheet will be included in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE—AIRCRAFT DATA SHEET

Service: Navy—Nomenclature: AH–1J (Assault Helicopter) P–1 Line Item No. 17, 18; Popular Name: SEA COBRA

Description/Mission.—The AH–1J is a helicopter gunship whose mission is the enroute escort and protection of troop assault helicopters; landing zone preparation immediately prior to the arrival of assault helicopters; landing zone fire suppression during the assault phase; and fire support during ground escort operations. The primary differences between the AH–1J and its Army developed AH–1G predecessor are the twin-engine power plant for safety, reliability and increased hot day performance; an improved armament system embodying a three barreled 20MM nose-mounted turret gun; and an armament management system for selective release and fuzing options for externally carried weapons.

COST DATA

[Dollars in millions]

	Fiscal year								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity	49.0			20.0	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]
Cost	59.5			29.9	24.8	23.8	20.5			158.5
Less advance procurement prior year				−1.3	−1.3	−1.0	−.8			−4.4
Net calendar year program	59.5			28.6	23.5	22.8	19.7			154.1
Plus advance procurement current year			+1.3	+1.3	+1.0	+.8				+4.4
Procurement unit cost	1.2			1.5	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]
Weapon system cost	59.5		1.3	29.9	24.5	23.6	19.7			158.5
Initial spares	7.2	1.0	.2	3.0	1.9	1.0	.8			15.1
R.D.T. & E.										
Milcon										
Program acquisition cost	66.7	1.0	1.5	32.9	26.4	24.6	20.5			173.6
Program unit cost										[Deleted]
Total additional cost	1.0	.5	.5	.9						2.9

Basis for Fiscal Year 1973 Budget Request.—The 20 AH–1J aircraft requested in FY 1973 are necessary to augment the 49 AH–1J's presently in the Marine Corps inventory. A force level of [deleted] operating AH–1J aircraft is planned to provide the active Marine Air Wing with modern helicopter gunship capability. The total program of [deleted] aircraft also provides for repair pipeline and attrition aircraft.

Test Data:

(a) Board of Inspection and Survey (BIS) trials completed December 1971.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	Bell Helicopter Co	Fixed-price incentive.
Engine	United Aircraft of West Virginia	Firm fixed price.

	Classification	Operational requirement	Demonstrated
Performance:			
Maximum speed at sea level (level flight).	U	137 knots	137 knots.
Radius with 1 hr. 15 min. loiter.	U	52 nautical miles	55 nautical miles.
Single engine rate of climb, 3,000 ft. 91.5°.	U	50 f.p.m	200 f.p.m.
Hover ceiling, hot day	U	500 ft	10,000 ft.
T400–CP–400 twin-pac	U	Full military qualification	Full military qualification successfully demonstrated.
Characteristics:			
Maximum takeoff weight	U	10,000 lbs	
Overall length	U	53 ft. 4 in	
Fuselage length/rotor diameter.	U	44 ft. 7 in./44 ft	
Crew	U	2	
Ordnance	U	20 mm. turret/external stores	

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	38	$29.0
R.D.T. & E		
Milcon		
Total program costs	38	29.0
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	[Deleted]	151.5
R.D.T. & E		
Milcon		
Total program costs		151.5
Current estimate total program (fiscal year 1973 budget submission):		
Procurement		173.6
R.D.T. & E		
Milcon		
Total program costs		173.6

Note.—Difference between fiscal year 1972 and fiscal year 1973 submissions: The current estimate for [deleted] AH–1J aircraft is $22.1 million higher than the program projected during the fiscal year 1972 submission. This increase is attributed to a reduction in yearly procurement increments, program stretchout, required configuration changes, and revised support requirements.

Admiral WEISNER. The AH–1J, an assault helicopter, is utilized by the Marine Corps to provide close-in ground fire suppression during aerial and ground escort operations, and landing zone preparation. It is, like its predecessor, the AH–1G, designed specifically for armed helo combat operations. The primary difference is the twin-

engine installation in the "J" for survivability and increased high altitude and high temperature performance, the improved armament system and an armament management system for selective release and fuzing of externally carried ordnance.

PLANNED PROGRAM AND 1973 FUNDING

The Marine Corps armed helicopter force requirement is [deleted] operation AH–1J aircraft. 49 AH–1Js have been previously authorized; 20 are requested in fiscal year 1973 and [deleted] are planned for procurement in future years; $29.9 million is requested to procure the 20 AH–1J helicopters with an additional $3.0 million required for initial spares.

Senator YOUNG. Is that the total requirement or will you be asking for more later?

Admiral WEISNER. [Deleted] are planned for procurement in future years, Senator Young.

USE OF OLDER MODEL AH–1G

Chairman ELLENDER. I notice from information furnished by Mr. Woodruff that none of these planes were bought during fiscal year 1971 and 1972. Why are you ordering them now? Why weren't they ordered for 2 years?

General HILL. We have been using the AH–1G, which is a single engine older model of the Cobra. We used these in Southeast Asia, Mr. Chairman.

TOTAL PROGRAM

We are currently structuring our helicopter force to provide [deleted] for each wing. We are buying the AH–1J, which is a much improved, twin engine version of the Cobra, to provide helicopters for [deleted] each marine aircraft wing.

We first procured AH–1J's in fiscal year 1969. No AH–1J's were procured in fiscal year 1971 and 1972. Current plans are for procurement through fiscal year 1976.

Chairman ELLENDER. How many of the AH–1Gs do you have?

General HILL. We have 49.

Chairman ELLENDER. How many do you plan to procure?

General HILL. The total buy is [deleted].

ANNUAL PROCUREMENTS THROUGH ARMY

Chairman ELLENDER. What is the nature of your production contract?

Admiral MCCLELLAN. This is not a multiyear contract. We buy through the Army. It is an annual buy in each case.

IMPROVEMENTS OVER OLD MODEL

Chairman ELLENDER. Will there be any improvements on the aircraft you are planning to purchase compared with the ones in past buys?

General HILL. Yes, sir. This helicopter, as I mentioned earlier, has two engines as opposed to the single engine, which gives it increased capability for mission effectiveness, particularly over water.

In addition, we have a 20-millimeter gun in the nose.

We also have an armament management system pilot in the cockpit which permits the pilot to use selective fuzing for rockets and for ordnance carried on the pylons. It is a much improved aircraft as a result of the engines and the overall armament system.

Use of Old Model in South Vietnam

Chairman Ellender. Did we lose any of the AH–1G's in Southeast Asia?

General Hill. Our loss rate was minimal. We used them in connection with the escort of our troop helicopters and for attack against ground targets. We do not use this helicopter in a close air support role against hard targets. We make sure it is employed correctly so that we minimize heavy losses in this helicopter.

Chairman Ellender. Those used in Southeast Asia were used to escort helicopters?

General Hill. Yes, sir.

Chairman Ellender. Were they used in connection with ground warfare?

General Hill. The ground, sir. As a matter of fact, this helicopter is very vauable in that respect because when these troop helicopters approach a landing site, if we have a gunship that is escorting close by, he can suppress small arms fire of the enemy or just from the psychological effect of the helicopter being there, the enemy refrains from firing on the troop-carrying helicopters. It is a very effective weapons system employed that way.

Financing of AH–1J Helicopters

Chairman Ellender. As I read the data sheet, you expect these 20 helicopters to cost $29.9 million, which is offset by $1.3 million advance procurement provided in fiscal year 1972, leaving a net requirement of $28.6 million for these 20 helicopters. However, in addition, you are requesting $1.3 million for advance procurement to support the planned program in fiscal year 1974, which gives the total requirement of $29.9 million exclusive of the $3 million requested for initial spares. Is this correct?

Admiral McClellan. That is correct.

Cost Comparison With AH–1G

Senator Young. How does the cost of the AH–1J compare to the AH–1G's procured in prior years?

Admiral McClellan. The 38 AH–1G's acquired by the Marine Corps in fiscal year 1968 were Army procured aircraft diverted to the Marines, immediately airlifted to Southeast Asia and dependent upon support assistance from the Army. There were minimal nonrecurring charges against these aircraft. Payback by the Navy to the Army in fiscal year 1969 was based upon a $361,000 flyaway unit cost. In comparison, the fiscal year 1973 flyaway unit cost of the AH–1J is $1,308,000. This $947,000 flyaway unit cost increase is a result of configuration changes, production line restart costs and inflation. I will provide the specifics of this for the record.

(The information follows:)

The following AH–1J items contributed heavily to the difference of $947 thousand in unit flyaway cost:

(1) New 20 mm electric gun turret.
(2) New 20 mm gun.
(3) Incorporation of twin engines in lieu of AH–1G single engine.
(4) Incorporation of avionics to meet Marine Corps requirements.
(5) Incorporation of a rotor brake.
(6) New wing stores armament management system.
(7) Incorporation of correction of AH–1G limited Board of Inspection and Survey discrepancies and AH–1J Navy Preliminary Evaluation discrepancies.
(8) AH–1J production line re-start.
(9) Economic growth factor from fiscal year 1968 to fiscal year 1973.

Future Assault Helicopter Plans

Chairman Ellender. Do the Marines have any plans to procure any assault helicopters in the near future other than the AH–1J, such as the Army's Cheyenne helicopter?

General Hill. The Marine Corps has no plans to procure an armed helicopter other than the request for the AH–1J in the current FYDP which is now before the Congress.

P–3C Orion ASW Patrol Aircraft

Chairman Ellender. We will now consider the request of $214.7 million for the procurement of the P–3C Orion ASW patrol aircraft. The aircraft data sheet will be included in the record at this point.

(The information follows:)

Fiscal Year 1973 President's Budget Estimate—Aircraft Data Sheet

Service: Navy—Nomenclature: P–3C (Patrol Aircraft) P–1 Line Item No. 19, 20; Popular Name: ORION

Description/Mission.—The primary mission of the P–3C is anti-submarine warfare (ASW): to detect, classify, track, localize and destroy conventional and high performance submarines (of the 1968–80 period); to conduct long-range barrier patrols, convoy escort, hold down, hunter-killer operations and area search in all weather conditions; and to act as in-flight area coordinator at a secene of action. Secondary missions are aerial mining, maritime surveillance, coastal shipping destruction and intelligence collection.

The P–3C aircraft is a land based, four engine, high speed turboprop ASW patrol aircraft. ASW systems include acoustic data processing of directional LOFAR (DIFAR), radar, low light level TV, electronic countermeasures (ECM) and magnetic anomaly detection equipment. The tactical system includes integrated display and inertial doppler navigator. It has the data handling capacity, flexibility and accuracy of an airborne digital data processing system thoroughly integrated with appropriate sensor, display, navigation, communication and armament equipments. The P–3C includes A–NEW capabilities which provide at least [deleted] times the tactical effectiveness of the P–3A/B. The P–3C differs from its predecessor P–3A by inclusion of the A–NEW capabilities, improved sensors and communications, and the use of T56–A–14 versus T56–A–10 engines. The P–3C differs from the P–3B by the inclusion of A–NEW avionics, improved sensors and digital command and control communications system.

COST DATA

[In millions of dollars]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate total program
Procurement:										
Quantity	70.0	12.0	24.0	24.0	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]
Cost	768.6	159.9	218.6	254.9	238.1	235.4	134.0			2,009.5
Less: Advance procurement prior year	−48.1	−20.1	−11.7	−40.2	−12.7	−11.7	−7.1			−151.6
Net current year program	720.5	139.8	206.9	214.7	225.4	223.7	126.9			1,857.9
Plus: Advance procurement current year	+68.2	+11.7	+40.2	+12.7	+11.7	+7.1				+151.6
Procurement unit cost	11.0	13.3	9.1	10.6	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]	[Deleted]
Weapon system cost	788.7	151.5	247.1	227.4	237.1	230.8	126.9			2,009.5
Initial spares	118.3	17.9	31.4	9.0	12.7	13.5	9.8			212.6
R.D.T. & E	66.7									66.7
Milcon										
Program acquisition cost	973.7	169.4	278.5	236.4	249.8	244.3	136.7			2,288.8
Program unit cost										[Deleted]
Total additional cost		3.6	9.1	9.9	12.1	12.5	13.3			60.5

Basis for FY 1973 Budget Request: The P–3C A–NEW, with demonstrated air ASW capability, is required to stay abreast of the rapidly growing Soviet submarine threat which now includes Yankee FBM types on patrol off both the East and West Coasts of the U.S. The 24 P–3C aircraft being procured will permit the transition of [deleted] additional patrol squadrons, the [deleted] squadrons, from P–3A's to P–3C's. The approved force level of [deleted] squadrons will ultimately contain [deleted] P–3C squadrons and [deleted] P–3B squadrons. This force level requires procurement of [deleted] P–3C's subsequent to FY 1973. 106 P–3C's were procured in FY 1972 and prior years.

Test Data:

(a) Board of Inspection and Survey Trials completed: Phase I—October 1969; phase II—April–July 1970.

CONTRACT DATA

Major subsystems	Contractor	Type of last contract
Airframe	Lockheed Aircraft Corp	Fixed price incentive.
Engine	General Motors Corp., Allison Division	Fixed price redeterminable.

	Classification	Operational requirement	Demonstrated
Performance:			
Take-off weight	U	135,000 lbs	135,000 lbs.
Speed maximum (at combat weight)	C	[Deleted.]	
Service ceiling	C	[Deleted.]	
Radius maximum (no loiter)	C	[Deleted.]	
Radius normal (loiter for ½ total flight time)	C	[Deleted.]	
Characteristics:			
Length/wing span	U	116'10"/99'8"	
Height/Height folded	U	33'9"/no fold	
Engine number/model	U	4/T56–A–14	
Crew	U	10	
Speed cruise (average)	C	[Deleted.]	
Loiter altitude	C	[Deleted.]	
Ordnance	C	[Deleted.]	

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	104	$1,227.5
R.D.T. & E		66.7
Milcon		
Total program costs	104	1,294.2
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	[Deleted]	2,293.4
R.D.T. & E	[Deleted]	66.7
Milcon	[Deleted]	
Total program costs	[Deleted]	2,360.1
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	[Deleted]	2,222.1
R.D.T. & E	[Deleted]	66.7
Milcon	[Deleted]	
Total program costs	[Deleted]	2,288.8

NOTES

Difference between fiscal year 1972 and fiscal year 1973 submission

The current price estimate for the P–3C program is $71,300,000 less than that reported in the fiscal year 1972 submission. This decrease is attributable to a reduction of [deleted] aircraft and the earlier procurement of the remaining aircraft at a more economical production rate ([deleted] in fiscal year 1973 through fiscal year 1975).

Admiral WEISNER. This aircraft, in the 5th year of production, continues their impressive entrance into our land-based antisubmarine warfare (ASW) patrol forces. The A-new computer integrated sensor concept provides us with a significant improvement in our capability to detect, track, and localize Soviet submarines. The P–3C is at least [deleted] times more effective than the P–3A/B.

PLANNED PROGRAM AND 1973 FUNDING

Our force level of 24 patrol squadrons will consist of [deleted] P–3C and [deleted] P–3B squadrons by fiscal year 1978. This requires a total procurement of [deleted] P–3C aircraft, with 106 already funded and an additional [deleted] to be procured in fiscal year 1974 and subsequent.

Our fiscal year 1973 request for $227.4 million to procure 24 P–3C's will permit transition of [deleted] additional squadrons, the [deleted] from P–3A's to P–3C's. Initial spares require an additional $9 million.

Chairman ELLENDER. Let me be sure that I understand what is included in this $227.4 million you are requesting for the procurement of P–3C aircraft. These 24 aircraft are estimated to cost $254.9 million, which is offset by $40.2 million advance procurement provided in fiscal year 1972, leaving a net requirement of $214.7 million for these 24 aircraft. You are also requesting $12.7 million advance procurement to support the procurement of these aircraft in 1974, and this gives a total of $227.4 million exclusive of the $9 million you are requesting for initial spares. Is this correct?

Admiral MCCLELLAN. Yes, Senator; that is correct.

COST INCREASES

Chairman ELLENDER. As I read the data sheet, the 24 aircraft funded in 1972 cost only $218.5 million. Just what accounts for the very large increase in the cost of this aircraft?

Admiral MCCLELLAN. In fiscal year 1972, the $218.5 million consists of $207.5 million for flyaway and $11 million for support, while in fiscal year 1973 the flyaway cost is $210.8 million and $44.1 million for support. The difference of $3.3 million in flyaway cost is attributed to the planned incorporation of the P–3C update program consisting of [deleted]. The difference of $33.1 million in support, which accounts for the major portion of the difference in cost, is attributed to the deferral of $14.2 million of support requirements from fiscal year 1972 to fiscal year 1973. This deferral was the ultimate result of congressional action which reduced the fiscal year 1972 program from 36 to 24 aircraft. Prior to the congressional reduction, existing contract options were executed for certain equipments related to the 12 P–3C aircraft deferred to fiscal year 1973. To avoid terminating these procurements and subsequently incurring higher costs, the Navy reprogramed $26.1 million to the fiscal year 1972 advance procurement program to finance these costs for the 12 aircraft. This reprograming was accomplished by deferring $14.2 million of support requirements. The

other $11.9 million was available within the funds provided by Congress for the 24 aircraft approved in fiscal year 1972. Therefore, in order to compare the P–1 line item for the 2 fiscal years the $14.2 million should be added to the 1972 program and subtracted from the 1973 program. The comparable costs would then be $232.7 million in fiscal year 1972 and $240.7 million in fiscal year 1973. This leaves a difference of $8 million existing between the two 24-aircraft programs. As mentioned above, $3.3 million of this $8 million is attributable to the P–3C update. The remaining $4.7 million is attributable to the addition of a Reserve site with all its inherent support, at Willow Grove, Pa.

Support Cost

Chairman Ellender. In looking over the aircraft cost analysis sheet, I note that very little of this increase is associated with the flyaway cost of these aircraft. The estimated unit flyaway cost of the 24 procured in fiscal year 1972 was approximately $8.7 million, and the flyaway cost of the 24 requested in fiscal year 1973 is approximately $8 million per aircraft. However, the total 1972 cost included $11 million for support cost, and the request for 1973 includes $44.1 million for support cost. Please comment on each of the seven different items included in the $44.1 million requested for support cost, and explain any significant increases over the amount provided for the comparable item in 1972.

Admiral McClellan. The $44.1 million reflected for support cost in fiscal year 1973 is associated with site outfitting rather than the procurement quantities. Included in the total support cost is $14.2 million of support requirements deferred from fiscal year 1972. Special support equipment funds of $23.8 million ($9.0 million deferred from 1972) will provide for outfitting of [deleted] additional patrol (VP) squadrons; two additional organizational and intermediate maintenance sites, including one Naval Reserve site at Willow Grove, Pa.; augmented depot support, and the procurement of new equipment in support of approved configuration changes. The $15.505 million for peculiar training equipment and factory training/training parts (including $5.2 million deferred from 1972) is to procure two 14B44 DIFAR trainers; two integrated maintenance trainers, and support calendar year 1972 approved configuration changes. The publications request of 2.389 million is for the incorporation of data generated as the result of approved configuration changes, issue of formal intermediate and depot level component maintenance manuals after verification of change recommendations, and incorporation of operational and tactical changes identified at the annual NATOPS flight manual conference. Contractor technical services of $2.375 million equate to approximately 62 man-years and are required to support operating P–3 aircraft at 17 sites. The decrease in CTS funds from 1972 is attributed to the planned conversion of contractor billets to in-house Navy billets.

1974 PROCUREMENT

Senator YOUNG. Earlier, we referred to the $12.7 million you are requesting for advance procurement to support the procurement of this aircraft in fiscal year 1974. How many aircraft are in your planned program for 1974?

Admiral MCCLELLAN. There are [deleted] aircraft in the planned program for 1974.

Senator YOUNG. When will these funds be obligated, and comment on the items involved in this advance procurement program.

Admiral MCCLELLAN. The obligation plan for the $12.7 million requested for advance procurement calls for cumulative obligations of $4.2 million by December 31, 1972, $5.4 million by March 31, 1973, and $12.7 million by June 30, 1973. Major P–3C equipments with a combined manufacturing/installation leadtime exceeding 18 months include engines, propeller systems, and peculiar avionics [deleted]. These are considered the pacing equipments requiring advance procurement funding to insure delivery of fully equipped aircraft at the rate of [deleted] per month commencing in [deleted].

INITIAL SPARES

Chairman ELLENDER. As indicated earlier, your request includes $9 million for the procurement of initial spares. I note that $31.4 million was provided for initial spares for the 24 aircraft funded in fiscal year 1972. How do you compute the requirement for initial spares for this aircraft?

Admiral MCCLELLAN. The aircraft initial spares provide support for initial site outfittings and pipeline (initial system backup stocks) in support of new or add-on increments of end items (aircraft/equipments) being introduced into the Navy, phased by fiscal year. Investment requirements are determined by the number, type, and deployment of aircraft being procured and entering the operating program. While investment spares are in support of the end items procured in other PAMN budget activities, actual budgeting and procurement is scheduled in the fiscal year in which the contract must be let to meet operating support requirements. Requirements for engines, major avionics equipments, and other equipments with a significant unit cost are calculated on an item-by-item basis, considering usage data and failure rates, or by utilizing engineering estimates of predicted usage for new components. Requirements for other investment spares and spare parts are calculated on a statistical basis, using the same criteria used for calculating major spare equipment requirements.

Chairman ELLENDER. I note that the initial planning estimate for this aircraft was based on a total program acquisition cost of $1,294.2 million, based on the production of 104 aircraft, which gives a unit total program acquisition cost of $12.4 million per aircraft. How does this compare to the current unit total program acquisition cost?

Admiral McClellan. The initial planning estimate of $1,294.2 million for a total of 104 aircraft, or $12.4 million per aircraft, was based on the planned procurement of the aircraft over a 4-year period—fiscal year 1968 through fiscal year 1971. The current estimate for the P–3C program is $2,288.8 million for [deleted] aircraft to be procured over a [deleted] year period—fiscal year 1968 through fiscal year [deleted]. This equates to a unit total program acquisition cost of [deleted] million per aircraft and is [deleted] per aircraft than the initial planning estimate of $12.4 million per aircraft.

S–3A ANTISUBMARINE AIRCRAFT

Chairman Ellender. Admiral, before you proceed with your discussion of the request for the procurement of the Viking aircraft, I want to include the aircraft data sheet in the record.

(The information follows:)

Fiscal Year 1973 President's Budget Estimate—Aircraft Data Sheet

Service: Navy—Nomenclature: S–3A (Anti-submarine Aircraft) P–1 Line Item No. 21, 22; Popular Name: VIKING

Description/Mission.—The S–3A has been designed to exploit the offensive anti-submarine warfare (ASW) capability of carrier-based aircraft. Such capability primarily stems from the carrier's mobility, independence from foreign air bases, and its ability to concentrate forces beyond the range of land-based aircraft. This aircraft will replace the S–2 TRACKER presently being used aboard anti-submarine carriers.

The S–3A is a twin engine turbofan aircraft with a crew of four. It will operate in the 400+-knot speed range at altitudes to [deleted] feet. With these characteristics, the S–3A, with its sensors, will be capable of searching large areas of the ocean and of detecting, localizing and destroying modern nuclear submarines. The two high-bypass turbofan engines (model TF34–GE–2) will give the S–3A its speed and high altitude capability, while still enabling it to operate economically at the lower altitudes required during certain phases of anti-submarine operations.

The S–3A will be equipped with the latest ASW sensors. The tactical information from these sensors will be controlled by a general purpose digital computer and depicted on multi-purpose displays for operator interpretation. The S–3A will be capable of carrying all conventional and nuclear airborne ASW weapons.

COST DATA

[In millions of dollars]

	Fiscal year—								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity	6.0	2.0	13.0	42.0	64.0	72.0				199.0
Cost			344.7	544.5	620.9	642.2				2,152.3
Less: Advance procurement, prior year			−22.7	−24.6	−51.0	−77.5				−175.8
Net current year program			322.0	519.9	569.9	564.7				1,976.5
Plus: Advance procurement, current year		+22.7	+24.6	+61.2	+67.3					+175.8
Procurement unit cost			26.5	13.0	9.7	8.9				11.3
Weapon system cost		22.7	346.6	581.1	637.2	564.7				2,152.3
Initial spares			26.0	51.5	103.7	73.6				260.8
R.D.T. & E	211.0	264.3	208.4	36.8	3.9	1.1				735.5
Milcon			1.6	1.6						3.2
Program acquisition cost	221.0	287.0	582.6	671.0	750.8	639.4				3,151.8
Program unit cost										15.8
Total additional cost						20.5	13.5			34.0

Basis for FY 1973 Budget Request: The 42 S–3A aircraft requested in FY 1973 represent the second production increment. This procurement, together with the 13 aircraft authorized in FY 1972, will provide assets for transitioning the first four fleet squadrons to S–3A's in CY 1974. The Navy's total S–3A requirement is 12 squadrons by FY 1977.

Test Data:

(a) Award engineering development contract	August 1969
(b) Airframe mockup completed	March 1970
(c) Avionics laboratory demonstration	January 1972
(d) First S–3A flight	January 1972
(e) Start Navy Preliminary Evaluation #1	May 1972
(f) Flying test bed demonstration	January 1973
(g) Begin BIS (Board of Inspection and Survey Trials)	October 1973
(h) Fleet introduction	February 1974

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	Lockheed-California Co	Fixed price incentive.
Engine	General Electric Co	Do.

PERFORMANCE DATA

[Deleted.]

CHARACTERISTICS DATA

	Classification	Operational requirement
Characteristics:		
Empty weight (no stores)	U	26,615 lbs.
Normal takeoff weight	U	43,483 lbs.
Maximum design gross weight	U	52,511 lbs.
Length	U	49.41 ft.
Height (wing and tail spread/folded)	U	22.75/15.66 ft.
Wing span (spread/folded)	U	68.66/29.50 ft.
Engines, number/designation	U	2/TF34-GE-2.
Crew	U	4.

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	193	$2,274.9
R.D.T. & E.	6	616.2
Milcon		
Total program costs	199	2,891.1
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	191	2,188.4
R.D.T. & E.	8	735.2
Milcon		2.4
Total program costs	199	2,926.0
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	191	2,413.1
R.D.T. & E.	8	735.5
Milcon		3.2
Total program costs	199	3,151.8

Note: Difference between fiscal year 1972 and fiscal year 1973 submissions:

Procurement.—The difference of $224,700,000 is the net result of the following changes: +$206,800,000—economic change—increase reflects change from contract target to ceiling price in lots IV, V, and VI, because of current and projected abnormal economic escalation. +$2,400,000—support change—composed of: +$66,300,000 increase in VAST programing to provide greater depth of avionics repair capability; +$29,800,000 increase in crew position trainers, additional training and miscellaneous support; and −$93,700,000 decrease in initial spares requirements. +$29,200,000—schedule change—increase due to reduction from 56 to 42 aircraft in fiscal year 1973 and resulting increases to 64 and 72 aircraft in fiscal years 1974 and 1975. −$13,700,000— estimating change—decrease in engines, armament and ground support equipment.

Milcon.—+$800,000—estimating change—adjusted costs for aircraft systems training buildings at Quonset Point and North Island.

S–3A AND S–2 AIRCRAFT

Admiral WEISNER. The S–3A is a carrier-based antisubmarine search and attack aircraft containing the last ASW sensors, integrated with a general purpose digital computer. It represents over 7 years of effort and has been designed to counter the capabilities of Soviet nuclear submarines.

The S–3A is designed to use air-to-surface missiles, homing torpedoes and mines, as well as conventional and nuclear depth charges. It replaces the S–2 aircraft and will introduce a carrier-based capability for searching large ocean areas and will provide antisubmarine protection for naval forces and other units independent of land bases.

AGE S–2 TRACKER

Chairman ELLENDER. How old are the S–2 Tracker aircraft that will be replaced by the Viking?

Admiral MCCLELLAN. The first production S–2A was accepted by the Navy in April 1953. The last production S–2E was delivered in December 1967. The basic S–2 model, therefore, will have been in inventory more than 20 years when the first S–3A are deployed.

AIRCRAFT AND AVIONICS SYSTEM TESTS

The S–3A program is on or ahead of schedule. First flight was on January 21, 2 months ahead of schedule, and was an unqualified success. Flight testing of the S–3A avionics system in a P–3C has been continuing since August 1971.

Although the fiscal year 1973 funding request will purchase the second lot of production aircraft, it represents the first large production procurement of S–3A's. Flying qualities of the S–3A will have been evaluated and S–3 avionics demonstrated prior to exercising the fiscal year 1973 production contract option on February 1, 1973.

We feel this testing will give sufficient confidence in the weapon system to continue production at this level even though Board of Inspection and Survey (BIS) trials and operational evaluation (Opeval) will not be completed until a year later.

PLANNED PROGRAM AND 1973 FUNDING

The 42 aircraft requested in fiscal year 1973 will continue the orderly production program. These aircraft, along with the 13 authorized last year, will transition four fleet squadrons from S–2's to S–3A's in 1974. A procurement of 191 aircraft is planned with an operating force of 12 squadrons by fiscal year 1977.

FLYAWAY UNIT COST AND PERFORMANCE CAPABILITY

We are requesting $581.1 million to procure 42 aircraft. Initial spares require an additional $51.5 million.

S–3A FUNDING

Chairman ELLENDER. As I read the data sheet, this $581.1 million includes the following: $544.5 million for the cost of the 42 aircraft,

which is offset by advance procurement of $24.6 million provided in fiscal year 1972, for a net requirement of $519.9 million associated with these 42 aircraft, and in addition, you are requesting $61.2 million for advance procurement, which gives the total of $581.1 million, exclusive of the $51.5 million requested for spares. Am I correct about this?

Admiral McCLELLAN. Yes, sir, that is correct.

Chairman ELLENDER. What is the unit cost of this aircraft?

Admiral WEISNER. The flyaway unit cost is $10.3 million.

PROCUREMENT UNIT COST

Senator YOUNG. I note on the data sheet that the procurement unit cost for fiscal year 1973 is stated at $13 million. I assume the difference between the $13 million and the $10.3 million for flyaway cost is made up of the various support cost items. Am I correct about this?

Admiral McCLELLAN. Yes, sir, that is correct.

Chairman ELLENDER. Does that include R. & D.?

Admiral WEISNER. That does not include R. & D., sir.

Senator YOUNG. If I read the data sheet correctly, when you consider the procurement cost, the cost of initial spares, the cost of research and development, and the cost of military construction, you will get a total of approximately $3.2 billion for the production of 199 aircraft, which gives a unit total program acquisition cost of $15.8 million per aircraft. Is this correct?

Admiral McCLELLAN. Yes, sir, that is correct.

FLY-BEFORE-BUY CONCEPT

Chairman ELLENDER. Funds were provided in fiscal year 1972 for the initial operational production of this aircraft, and as we indicated, you are requesting funds for 42 additional operational aircraft in fiscal year 1973. However, on page 2 of the data sheet, under the performance information, with respect to the various operational requirements, I note the statement that none of these operational requirements have yet been demonstrated. If these specific operational requirements have not yet been demonstrated, Admiral, how can we consider this airplane to be under the fly-before-you-buy concept?

Admiral McCLELLAN. The S–3A contract was signed prior to full implementation of the current fly-before-buy policy. However, the contractor is required to complete certain milestones prior to Government commitment to each production lot. Contractual milestones scheduled for completion prior to the 42 aircraft option date include an evaluation of the flying qualities and performance of the airplane and an evaluation of the avionics system as installed in a P–3A flying test bed. By the February 1, 1973 lot IV order date most of the specific operational requirements to which you refer will have been demonstrated and there will be a great deal of confidence in the capability of the contractor to demonstrate the remainder.

Chairman ELLENDER. We are to assume that you are satisfied with the performance?

Admiral McCLELLAN. Yes, sir.

Chairman ELLENDER. And that it is ready for the inventory?

Admiral McCLELLAN. Yes, sir. The aircraft is now flying. It achieved that milestone in January vice the required March completion date. The flying test bed is flying as a laboratory demonstration which was required in the contract. We feel that we are ready to place the first production order with 1972 funds.

CARRIER-BASED ANTISUBMARINE WARFARE AIRCRAFT

Chairman ELLENDER. Will these be flown from a carrier?

Admiral McCLELLAN. This is a carrier-based anti-submarine warfare plane.

ADVANCE PROCUREMENT

Chairman ELLENDER. Admiral, I am not clear on this item of $61.2 million for advance procurement. As I read the data sheet, $51 million of this total is for the support of the planned fiscal year 1974 procurement program, and $10.2 million is for the support of the fiscal year 1975 program. Is this correct?

Admiral McCLELLAN. $51 million of the $61.2 million total is for support of the planned fiscal year 1974 procurement program, as you stated. The balance of $10.2 million is for "phased provisioning," a DOD-initiated concept which is designed to provide insurance to the program by having on hand a buffer stock of one or two additional items of certain components. This concept has many advantages including more flexibility in making decisions as to quantity procurement of spares. The phased provisioning technique does not increase the total program costs in any way. The $10.2 million advanced this year is repaid later in the program.

Chairman ELLENDER. Isn't it a little unique to request advance procurement funds 2 years in advance?

Admiral McCLELLAN. The "phased provisioning" concept does not meet the conventional definition of advance procurement per se. It is understood that the Air Force has been using this technique for several years and has indicated sizeable savings on the total program costs as a result.

Chairman ELLENDER. With respect to the $51 million that is required for advance procurement for the fiscal year 1974 program, how many ariplanes do you plan to procure in fiscal year 1974?

Admiral McCLELLAN. Present plans are for the procurement of 64 aircraft in fiscal year 1974.

Senator YOUNG. When do you expect to obligate this $51 million, and what are the specific items included in this advance procurement program?

Admiral McCLELLAN. The $51 million will be obligated between January and July 1973, $26.4 million of long leadtime funds are contractually required by the prime contractor—$4 million in April and $22.4 million in July. The balance of $24.6 million is for Government Furnished Equipment (GFE) items. These GFE items are determined by a combination of installation and manufacturing lead times which force procurement of the items prior to the availability of regular budget year funds. The major GFE items are the TF34 engine, APS–116 radars, ASN–92 navigation equipment, and ASQ–81 magnetic anomaly detection equipment.

MILITARY CONSTRUCTION

Senator YOUNG. I note a reference to a fiscal year 1973 requirement of $1.6 million for military construction. What is the nature of this requirement?

Admiral MCCLELLAN. $800,000 is for the second increment of a weapons systems training building at the Naval Air Station, North Island, Calif. This building houses a weapons system trainer and a naval air maintenance trainer, $781 thousand is for a weapons system training building at the Naval Air Station, Quonset Point, R.I., which houses a weapons system trainer only.

INCREASES IN S-3A PROGRAM

Chairman ELLENDER. The initial planning estimate for the S-3A aircraft was based on a total program acquisition cost of $2,891.1 million for the production of 199 aircraft, which equates to $14.5 million total program acquisition unit cost. I note the current estimate is based on a total estimated cost of $3,151.8 million for the production of 199 aircraft, which gives a unit total program acquisition cost of $15.8 million per aircraft. Would you please comment on the major increases involved.

Admiral MCCLELLAN. The increase of $260.7 million from the development estimate of 1968 to the current estimate can be categorized as follows:

Economic Changes, escalation experienced and projected, $212.3 million; Estimating Changes $10.5 million; Contract Cost Overrun, GFE CAINS System, $1.0 million; Engineering Changes, Minus, $9.8 million; Support Changes $12.0 million; and Schedule Changes $34.7 million.

FLYAWAY COST

Chairman ELLENDER. How much of the total estimated cost of $544.5 million for these aircraft is for the flyaway cost, and how much is for support cost?

Admiral MCCLELLAN. $433.8 million is flyaway cost and $110.7 million is support cost.

SUPPORT COST

Chairman ELLENDER. Please comment briefly on each of the items included in the $110.7 million for support cost.

Admiral MCCLELLAN. I will be happy to furnish that.

(The information follows:)

	Millions
Airframe PGSE (VAST test program sets and airframe PGSE)	$42.7
Engine PGSE	9.5
Avionics PGSE (for GFE avionics)	11.7
Peculiar training equipment (WST and part task trainers)	24.3
Publications/tech data	10.7
Factory training/training parts (flight and maintenance)	3.9
Contractor tech services	1.2
Repair of repairables	1.4
Facilities readiness/maintenance engineering analysis	.1
ASP-116 radar integrated logistic support	.8
Maintenance engineering services/pilot rework/inventory management equipment	.4
Board of Inspection and Survey	4.0
Total support cost	110.7

E-2C HAWKEYE EARLY WARNING AIRCRAFT

Chairman ELLENDER. If there are no further questions or comments on the Viking ASW aircraft, we will proceed with the consideration of the request for $129.9 million for the procurement of the E-2C Hawkeye warning aircraft. The aircraft data sheet will be included in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE—AIRCRAFT DATA SHEET

Service: Navy—Nomenclature: E-2C P-1 Line Item No. 23, 24; Popular Name: Hawkeye

Description/Mission.—The E-2C is an all-weather, carrier-based combat information center aircraft which extends task force defense perimeters by providing early warning of approaching enemy units and vectoring interceptors into attack position. In addition to this function, the Hawkeye also provides strike and traffic control, area radar surveillance, search and rescue assistance, and communications relay.

The E-2C features a new generation of avionics (radar, passive detection system, voice and data link communications) which offers both expanded capabilities and improved reliability and maintainability. It has a high wing and is powered by two T56-A-422 turbo-prop engines. The E-2C is easily identified by the 24-foot diameter rotodome (antenna housing) and the four vertical tails. Designed for a crew of five, the E-2C complement is: pilot, co-pilot, radar operator, air-control officer, and combat information center officer. The specialized electronic equipment makes it feasible for three operators to search, identify, and track targets as well as control interceptions

COST DATA

[Dollars in millions]

	Fiscal year								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity	2.0		11.0	8.0	[deleted]					[deleted]
Cost			$268.8	$146.6	$159.0					$574.4
Less: Advance procurement, prior year			−44.0	−16.7	−18.2					−78.9
Net current year program			224.8	129.9	140.8					495.5
Plus: Advance procurement, current year		+$44.0	+16.7	+18.2						+78.9
Procurement, unit cost			24.4	18.3	[deleted]					20.5
Weapon system cost		44.0	241.5	148.1	140.8					574.4
Initial spares			32.4	21.4	21.7					75.5
R.D.T. & E	$104.4	57.5	30.9	14.1	1.4					208.3
Milcon										
Program acquisition cost	104.4	101.5	304.8	183.6	163.9					858.2
Program unit cost										[deleted]
Total additional cost					1.8	4.4	4.8			11.0

Basis for FY 1973 Budget Request.—The Navy's early warning operating force objective is composed of [deleted] E–2B's which have recently been updated and [deleted] E–2C's. The FY 1973 E–2C procurement is the second increment of a three-year plan toward this objective. E–2C aircraft will be deployed in [deleted] aircraft squadrons on [deleted] attack carriers.

Test Data:

Project initiated	June 1968
First flight of production aircraft	[Deleted.]
Start NPE (Navy Preliminary Evaluation)	
Number 1	[Deleted.]
Number 2	[Deleted.]
Begin BIS (Board of Inspection and Survey) Trials	[Deleted.]
Complete BIS	[Deleted.]
Demonstration of passive detection system	[Deleted.]

At the end of December 1971 two E–2C aircraft had flown 733 hours in a continuing flight test program. 5,464 hours of laboratory and ground testing on the entire weapon system had been accomplished at the prime contractor's plant.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	Grumman Aerospace Corp	Fixed price incentive.
Engine	General Motors Corp., Allison Division	Fixed price redeterminable.

	Classification	Operational requirement	Demonstrated
Performance:			
Speed:			
Speed at 13,500 ft	U	315 knots	315 knots.
Cruise at 24,450 ft	U	270 knots	270 knots.
Time on station at 200 nautical miles	U	4.0 hrs	Not demonstrated.
Service ceiling	U	28,100 ft	28,100 ft.
Radar detection range (maximum) and probability of detection:			
(a) [Deleted]	C	[Deleted]	
(b) [Deleted]	C		
Passive detection system:			
(1) Range	C		
(2) Azimuth	C		

	Demonstrated
Take-off weight (pounds)	51,535
Length/span	57'6"/80'7"
Engine, number/type	2/T56A–422
Crew	5

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	[Deleted.]	$501.9
R.D.T. & E.		60.1
Milcon		
Total program costs	[Deleted.]	562.0
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	[Deleted.]	642.4
R.D.T. & E.		209.3
Milcon		
Total program costs	[Deleted.]	851.7
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	[Deleted.]	649.9
R.D.T. & E.		208.3
Milcon		
Total program costs	[Deleted.]	858.2

Differences between FY 1972 and FY 1973 submissions:

Increased procurements costs result primarily from higher projected airframe costs in FY 1974.

AIRCRAFT DESCRIPTION

Admiral WEISNER. The E–2C is a carrier based turboprop aircraft equipped with the necessary avionics to provide our forces at sea with a modern and vastly improved early warning, strike control and surveillance capability.

The E–2C has the same basic airframe as the earlier model E–2A/B but is equipped with a new avionics suit including new radar, antenna and passive detection system.

This equipment provides improved capabilities, including overland detection of air targets, and greatly enhanced reliability. This aircraft represents a significant improvement over previous early warning aircraft.

TESTS

Two prototype aircraft (converted E–2As) are in flight test at Grumman. All major components have been tested and system integration testing is in process. The first Navy preliminary evaluation (NPE) commenced in January and preliminary reports are gratifying. All major milestones have been met and the program is currently on schedule and within cost.

CONTINUING USE OF OLDER E–1B

There is an existing deficiency of E–2 aircraft necessary to cover all carrier decks. This has necessitated the retention of the older and obsolete E–1B, which is not an adequate airborne early warning (AEW) system to meet present threats.

PLANNED PROGRAM AND 1973 FUNDING

Procurement of the initial increment of 11 aircraft was authorized in fiscal year 1972 and production is currently underway. The requested fiscal year 1973 funding of $148.1 million is for procurement of the second increment of eight toward the currently approved program of [deleted] aircraft.

Additional procurement will be required if we are to continue the orderly upgrading of fleet AEW capability.

Initial spares will require an additional $21.4 million.

E–2C FUNDING

Chairman ELLENDER. As I understand the data sheet, the $148.1 million includes the following: $146.6 million for the procurement of the eight aircraft, which is offset by $16.7 million advance procurement provided in fiscal year 1972, giving a net requirement of $129.9 million for these eight aircraft, and you are requesting $18.2 million advance procurement to support your planned production program of this aircraft in fiscal year 1974. This gives you the total of $148.1 million, exclusive of the $21.4 million required for initial spares. Is this correct?

Admiral MCCLELLAN. Yes, sir; that is correct.

REVISION OF 5-YEAR PLAN

Chairman ELLENDER. Admiral, you indicate that additional E–2C aircraft will be required beyond the currently approved program of

[deleted] aircraft to continue to upgrade the fleet airborne early warning capability. Has the Navy presented this additional requirement to the Department of Defense, and if so, did the Department of Defense take any action on the Navy's request?

Admiral WEISNER. No sir. However, in the present update and revision of the 5-year defense plan we are striving to accommodate additional buy of the E–2C for [deleted].

POSSIBLE OPERATION FROM LAND BASE

Senator YOUNG. Are these for use solely on our aircraft carriers?

Admiral WEISNER. These are designed for use from our aircraft carriers. They could, of course, be operated from land with a modest amount of support equipment which you normally have available on a carrier.

REPLACED AIRCRAFT

Senator YOUNG. What plane will they replace?

Admiral WEISNER. The T–2A's and B's, and the E–1B. The E–1B is an early version.

CARRIER RADAR COVERAGE EXTENSION

Chairman ELLENDER. This plane is to be used to warn the carrier on which it is stationed of incoming attack forces. Is that correct?

Admiral WEISNER. That is correct, Senator Ellender. This airplane can be put out on a picket station from the carrier 100 or 150 miles or even more to extend a radar coverage of the carrier.

Chairman ELLENDER. How many will be required for each carrier?

Admiral WEISNER. [Deleted] will be the number that we normally operate.

Chairman ELLENDER. Will it detect missiles?

Admiral WEISNER. Missiles; yes, sir. It has a passive detection system, which is the first time that we have had this in an airplane of this type, which is designed to detect missile launching platforms.

COMPARISON WITH AWACS

Chairman ELLENDER. Will that serve the purpose similar to AWACS?

Admiral MCCLELLAN. That is an Air Force development, sir.

Chairman ELLENDER. I understand that. But their purposes are similar.

Admiral MCCLELLAN. They have similar purposes, Senator Ellender.

Chairman ELLENDER. At what range can you detect missiles?

Admiral WEISNER. The radar range is [deleted] nautical miles.

ADVANCED PROCUREMENT FOR 1974 PROGRAM

Chairman ELLENDER. Earlier, we referred to the $18.2 million included in the fiscal year 1973 request for advance procurement to support the production of this aircraft in fiscal year 1974. How many aircraft are included in your planned program for fiscal year 1974?

Admiral MCCLELLAN. [Deleted] aircraft.

PROCUREMENT UNIT COST REDUCTION

Senator YOUNG. I note that the procurement unit cost of this aircraft for fiscal year 1973 is $18.3 million compared to $24.4 million for fiscal year 1972. I assume this reduction is the result of being further along in the production program. Am I correct about this?

Admiral MCCLELLAN. Yes, sir.

INITIAL SPARES

Chairman ELLENDER. Just how did you compute the requirement of $21.4 million for the procurement of initial spares for these aircraft?

Admiral MCCLELLAN. This requirement is computed as the total for initial spares for four categories of material:

Engines, $1.9 million; Other Government Furnished Equipment, $1.6 million; Contractor Furnished Equipment, $16.3 million; and Peculiar Ground Support Equipment, $1.6 million.

FLYAWAY AND SUPPORT COST

Chairman ELLENDER. How much of the estimated cost of $146.6 million for these eight aircraft is for the flyaway cost, and how much is for the support cost?

Admiral MCCLELLAN. The flyaway cost is $119.6 million and the support cost is $27 million.

PROGRAM ACQUISITION COSTS

Chairman ELLENDER. On page 4 of the data sheet, I note that the total program acquisition cost of this aircraft has increased from $589 million in the initial planning estimate to the curent estimated cost of $858.2 million. Generally speaking, what has caused these increases?

Admiral MCCLELLAN. Generally speaking, the increases were caused by configuration changes such as inclusion of the passive detection system, schedule changes which delayed initial delivery and slowed delivery rates from 1 aircraft to ⅔ aircraft per month for the last 17 aircraft, inflation over that forecast in 1968, and refinement of cost estimates.

MEDIUM TWIN-JET AIRCRAFT

Chairman ELLENDER. If there are no further questions or comments on the E–2C aircraft, we will proceed with the consideration of the next category, which is airlift aircraft. The first aircraft in this category is the medium twin jet. The aircraft data sheet will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—AIRCRAFT DATA SHEET

Service: Navy Nomenclature: C–(Medium Twin Jet) P–1 Line Item No. 25; Popular Name:

Description/Mission.—This aircraft is a commercial, competitively procured, land-based transport configured to carry either cargo or personnel. These aircraft will be utilized for priority transit of cargo and personnel, supplementing MAC (Military Airlift Command) and commercial resources to meet Navy airlift requirements.

COST DATA

[In millions of dollars]

	Fiscal year—								Cost to complete	Current estimate, total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity			5	3	2			5	18	33
Cost			26.0	15.6	12.6			33.6	126.8	214.6
Less: Advance procurement, prior year										
Net: current year program			26.0	15.6	12.6			33.6	126.8	214.6
Plus: Advance procurement, current year										
Procurement unit cost			5.2	5.2	6.3			6.7	7.0	6.5
Weapon system cost			26.0	15.6	12.6			33.6	126.8	214.6
Initial spares			1.3		.6			.1	6.2	8.2
R.D.T. & E										
Milcon										
Program acquisition cost			27.3	15.6	13.2			33.7	133.0	222.8
Program unit cost										6.8
Total additional cost										

Basis for FY 1973 Budget Request.—The medium twin jets requested in FY 1973 will be a follow-on buy of the same aircraft procured competitively in FY 1972. These 3 aircraft are the second increment of a planned 33 jet aircraft force necessary to satisfy medium jet transport requirements. They will replace more than twenty-year-old C118s, C121s, and C131s at a replacement ratio of 2 jets to 5 propeller type aircraft. Modernization and replacement of these obsolete propeller aircraft will result in more economical operating costs and increased mission effectiveness.

Test Data.—A test program is not necessary since these aircraft have been operating in commercial service for many years.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe/engine	Will not be known until competitive fiscal year 1972 contract is awarded	(1)

[1] Award of fiscal year 1972 contract planned for May 1972.

Requirement		Classification	Demonstrated: Boeing 737	Demonstrated: Douglas DC-9
Performance (2 probable contenders for this procurement are the Boeing 737 and the Douglas DC-9):				
Normal cruise speed	2,250 nautical miles against a 65-knot headwind; cabin payload of at least 10,000 lbs. with military engine specs. fuel reserve assuming failure at (ETP) equal time point; minimum of 90 passenger or 20,000 lbs. cargo.	U	0.64 mach	0.66 mach.
Speed/maximum altitude		U	0.79 mach/ 35,000 ft.	0.79 mach/ 35,000 ft.
Maximum range, with 1,000 lbs. cargo (military specifications).		U	2,800 nautical miles.	2,400 nautical miles.
Maximum cruise altitude		U	35,000 ft	35,000 ft.
Maximum cargo, for 1,000 nautical mile range.		U	32,000 lbs	30,000 lbs.
Characteristics:				
Maximum take-off weight			114,500 lbs	110,000 lbs.
Length/wing span			96 ft. 1 in./93 ft.	119.13 ft./93.3 ft.
Engines, no./designation			2/JT8D-9	2/JT8D-9.
Crew			3	3.

Inventory objective: End of fiscal year 1973 FDP[1]

Total operating aircraft	8
Other active aircraft	–
Total active aircraft	8
Inactive aircraft	–
Losses aircraft	–

[1] Note: FDP = funded delivery period.

PRODUCTION DATA

	Quantity	Fiscal year															
		1971 and prior	1972: Quarter				1973: Quarter				1974: Quarter				1975	1976	1977	1977 beyond
			1	2	3	4	1	2	3	4	1	2	3	4				
Procurement year:																		
1970 and prior																		
1971																		
1972	5										3	2						
1973	3													1	2			
1974	2															2		
1975																		
1976																		
1977	5																	5
Balance	18																	18
Inventory losses (during year)																		
Inventory (end of year)														6	8	10	10	

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	33	$204.7
R.D.T. & E		
Milcon		
Total program cost	33	204.7
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	33	204.7
R.D.T. & E		
Milcon		
Total program cost	33	204.7
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	33	222.8
R.D.T. & E		
Milcon		
Total program cost	33	222.8

Difference between FY 1972 and FY 1973 submissions:

The approximately ten percent increase in cost of this program reflects (1) a $2 million increase in the estimated cost of the FY 1972 program based on the latest estimated costs for the contender aircraft and (2) inflation resulting from procuring the bulk of the aircraft later than originally planned. At the time of last year's submission, all 33 aircraft were to be procured by FY 1977. The current plan is to procure 23 of the 33 aircraft in FY 1977–1979.

Admiral WEISNER. The medium twin jet we are requesting in fiscal year 1973 will be a follow-on buy of the same model and series we were authorized to buy in the fiscal year 1972 budget and which will be procured competitively this year.

This aircraft is an off-the-shelf, twin fan jet commercial aircraft capable of carrying 90 passengers or 20,000 pounds of cargo, or combinations thereof. The Boeing 737 and the McDonnell-Douglas DC–9 are the competing types for this procurement.

PLANNED PROGRAM AND 1973 FUNDING

The three aircraft requested in fiscal year 1973 are the second increment of a planned 33 jet aircraft force necessary to satisfy Navy medium jet transport requirements. They will replace the 20+ year old C–118's, C–121's, and C–131's at a replacement ratio of two jets to five propeller-type aircraft. Significant operating savings will result from replacement of these old propeller aircraft which are increasingly more costly to fly and maintain.

We are requesting $15.6 million for three aircraft.

RAPID TRANSPORT OF HIGH PRIORITY PERSONNEL AND CARGO

Chairman ELLENDER. What will this transport be used for, primarily?

Admiral WEISNER. These will be used in our logistics squadrons, Senator Ellender, and will replace some very, very old airplanes such as the C–118 that are over 20 years old and are getting costly to maintain in the way of parts and, even more so, demand for manpower.

Chairman ELLENDER. I notice in the corner of the chart on the screen that the mission is rapid air transport for high priority personnel and cargo. What do you mean by "high priority personnel"?

Admiral WEISNER. We don't mean high priority here in terms of VIP people. We are talking in terms of the requirement to move substantial numbers of our men from one area to another. When we deploy from locations from the west coast, from San Diego to Yuma, we send squadrons over there for training; this aircraft will be a used for that. We have logistics squadrons, as you know, whose primary mission is to provide support.

Chairman ELLENDER. Is this to be used during training?

Admiral WEISNER. No; I misled you, Mr. Chairman. Let us say we had critical parts that we had to get, from one place to another, as an example.

Chairman ELLENDER. In this country?

Admiral WEISNER. In this country.

POSSIBLE UTILIZATION OF COMMERCIAL CARRIERS

Chairman ELLENDER. Why could you not use commercial airplanes for that?

Admiral WEISNER. Commercial carriers, Senator, can't respond on an unscheduled basis. They are good whenever we have the scheduled runs but whenever we don't have a fixed schedule it becomes difficult to meet this requirement with a commercial carrier.

Chairman ELLENDER. Could you not transport parts by the regular methods of transportation instead of using these planes, which are very costly to operate? I presume this operation requires maintenance personnel involving related costs.

Admiral WEISNER. I would say that the maintenance requirement of men is a modest number. It is not an inordinately high number for this type of airplane at all.

I would say that the airplane, Mr. Chairman, is primarily for base-to-base operations off of commercial routes and where, as I indicated, rapid or unique response is required. We have a small number of these, as you notice, five approved in 1972.

Chairman ELLENDER. Your total program envisions 33?

Admiral WEISNER. That is correct, sir. I was just about to say just that. This is not something new at all, Mr. Chairman.

Chairman ELLENDER. I know it isn't. But why can't you use ordinary methods of transportation? Why must you have a costly plane to do this during peacetime?

Admiral WEISNER. I think again the primary reason a regularly scheduled carrier is not suitable is because this is not done on any fixed schedule basis. The need will vary from time to time. This includes air wings, squadrons, special weapons, and other security sensitive cargo is also involved.

PRESENT UTILIZATION OF OLDER AIRCRAFT

Chairman ELLENDER. How are you presently performing this mission?

Admiral WEISNER. We are doing it now with 118's that are over 20 years old, 121's and 131's. These will replace those on a ratio of 2 to 5.

Chairman ELLENDER. These will be used for the same purposes as the 118's are?

Admiral WEISNER. That is correct.

AIRLINE OFFER TO LEASE EXCESS AIRCRAFT

Senator YOUNG. If my information is correct, one of the airlines is caught with surplus planes and has offered to lease these planes to the Navy on a 10-year basis. They want to maintain them.

I would like more information on the offer of at least one of these airlines to lease very modern planes to the Navy for the same purpose. You have a need for these, but if you can lease them for practically nothing, it would be better than buying them.

Admiral MCCLELLAN. Mr. Young, there has been an offer by at least one airline and we understand interest has been expressed by other airlines to make available to the Navy on a gift basis some 10 or 12 years old very large jet transports which are excess to the airline needs. In exchange for this gift, they would require a 10-year maintenance contract with cancellation features in the event the service did not use the full 10 years. The aircraft are proposed to initiate modernization of our Naval Reserve transport squadrons.

This is a new concept of procuring aircraft for the services.

We have written your committee about this, and asked for approval in principle prior to our pursuing this further.

I have Mr. Ellender's letter suggesting, due to the many novel features of the proposal, a hearing might be in order.

Senator YOUNG. I would like more information on that, especially if they are good planes. Are they obsolete? As I understand it, they are quite modern planes.

Admiral MCCLELLAN. The airplanes that we have specifically looked at are 707–720 aircraft. These are a version of the Boeing 707 which we see in such general airline use.

The airlines have apparently found it more economical to replace these with later aircraft such as the 727's. They are, however, essentially modern aircraft, less than 10 years old, and they are jet transports of quite large capacity.

Senator YOUNG. They will lease them without cost to the Navy?

Admiral MCCLELLAN. They would, according to the offer, give them to the Government for use in exchange for a 10-year maintenance contract for which they would be paid.

Senator YOUNG. I understand they want the maintenance contract so that they can have good maintenance shops for themselves.

Admiral MCCLELLAN. I am not sure what their motives are.

The benefits to the Government, of course, would be the obtaining of modern aircraft, or certainly more modern than we now have, at

a lesser cost than procuring new aircraft might be. This, of course, needs to be carefully looked at and Mr. Ellender's letter suggested precisely that.

Senator YOUNG. Thank you.

1972 APPROPRIATION: COMPETITIVE BID PROCUREMENT

Chairman ELLENDER. I understand that you requested funds last year for some of these planes.

Admiral WEISNER. Five medium twin jets were approved last year, Mr. Chairman. These of course, serve the regular Navy fleet logistics squads needs, not the Naval Reserve modernization requirements served by the large used aircraft Admiral McClellan was just discussing.

Chairman ELLENDER. Did you contract for those five?

Admiral MCCLELLAN. Not yet, sir.

Chairman ELLENDER. Why not?

Admiral MCCLELLAN. We had to go competitive to the interested companies. The Boeing and Douglas companies are the two competitors. We now have the proposals coming in. We expect to award the contract in April of this year, sir.

UNIT COST

Chairman ELLENDER. What will be the approximate cost of each of these planes? I notice the unit cost is $6.8 million.

Admiral WEISNER. For the three, the quantity now that we are asking for, the flyaway cost would be $5 million. We do have some support equipment that is required.

Admiral MCCLELLAN. When we let the contract and have our actual competitive figure, this may be modified. This is our current estimated cost.

CT–39 SABRELINER TRANSPORT AIRCRAFT

Chairman ELLENDER. The next request is for $7.9 million for the procurement of 5 CT–39 Sabreliner transport aircraft. The aircraft data sheet will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE AIRCRAFT DATA SHEET

Service: Navy—Nomenclature: CT–39E P–1 Line Item No. 26; Popular Name: Sabreliner.

Description/Mission: The CT–39 is a light weight, twin turbojet, high speed rapid response transport aircraft. The CT–39E (model 60) can accommodate 10 passengers with nominal baggage or various other combinations of passengers and high priority cargo.

COST DATA

[In millions of dollars]

	Fiscal year								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity	7.0		2.0	5.0	4.0	4.0	8.0	34.0	39.0	103.0
Cost	7.3		3.3	7.9	6.8	7.1	13.7	57.3	81.4	184.8
Less: Advance procurement, prior year										
Net current year program	7.3		3.3	7.9	6.8	7.1	13.7	57.3	81.4	184.8
Plus: Advance procurement, current year	1.0		1.7	1.6	1.7	1.8	1.7	1.7	2.1	1.8
Procurement unit cost	7.3		3.3	7.9	6.8	7.1	13.7	57.3	81.4	184.8
Weapon system cost	2.4		.5	.4	.4	.4	.4	2.0	4.1	10.6
Initial spares										
R.D.T. & E.										
Milcon										
Program acquisition cost	9.7		3.8	8.3	7.2	7.5	14.1	59.3	85.5	195.4
Program unit cost										1.9
Total additional cost										

Basis for FY 1973 Budget Request.—The CT–39's requested in FY 1973 will replace obsolete C–47's, C–117's, and C–54's at a ratio of approximately one jet for two propeller aircraft. Procurement of CT–39's is one phase of a Navy program to replace costly to maintain older airlift aircraft with a modern jet fleet.

Test Data.—The CT–39E is a commercial aircraft certified by the Federal Aviation Agency (FAA). No military tests are contemplated.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	North American Rockwell	Firm fixed price.
Engine	United Aircraft Corp., Pratt & Whitney Division	Subcontract.

	Classification	Operational requirements	Demonstrated
Performance:			
Maximum take-off weight	U	20,372 lbs	20,372 lbs.
Maximum landing weight	U	17,500 lbs	17,500 lbs.
Maximum cruise altitude	U	45,000 ft	45,000 ft.
Cruise speed	U	400 knots at 35,000 ft	400 knots at 35,000 ft.
Characteristics:			
Length			46.7 ft.
Height			16 ft.
Wing span/sweep			44 ft. 5 in./28.5°.
Engine number/type			2/JT 12A–8.
Crew			2.

End of fiscal year FDP[1]

Inventory Objective:	
Total operating	12
Other active	1
Total active	13
Inactive	----
Losses	1

[1] NOTE.—FDP=funded delivery period.

PRODUCTION DATA

Fiscal year	Quantity	Fiscal year— 1971 and prior	1972: Quarter 1	2	3	4	1973: Quarter 1	2	3	4	1974: Quarter 1	2	3	4	1975	1976	1977	Beyond 1977
Procurement year:																		
1970 and prior	7	7																
1971																		
1972	2			2														
1973	5										2	3						
1974	4														2	2		
1975	4															2	2	
1976	8																4	4
1977	34																	34
Balance	39																	39
Inventory losses (during year)															1	1	1	
Inventory (end of year)		7		9			9				14				15	18	23	

	Quantity	Amount
Cost history comparison:		
Initial planning estimate:		
Procurement	103	$195.4
R.D.T. & E.		
Milcon		
Total program costs	103	195.4
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	103	195.4
R.D.T. & E.		
Milcon		
Total program costs	103	195.4
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	103	195.4
R.D.T. & E.		
Milcon		
Total program costs	103	195.4

Note: Difference between fiscal years 1972 and 1973 submissions: None.

Admiral WEISNER. The CT–39 is a commercial twin jet aircraft produced by North American Rockwell. The civilian designation of this aircraft is Sabreliner series 60. It carries eight to 10 passengers or equivalent weight in cargo, and is operated by a crew of two.

The CT–39 will be used for the purpose of providing rapid response airlift for high priority, time critical cargo and personnel. The aircraft will be assigned to Navy and Marine tactical support squadrons in support of fleet and Marine Corps operations.

There are currently seven CT–39's in the Navy inventory and two additional aircraft were authorized in fiscal year 1972.

The CT–39 has been proven to be economical to operate and highly reliable resulting in substantial reduction of aircraft operating costs compared to the C–47, C–54, and C–117 aircraft which they replaced.

Because of ever increasing operating costs and decreasing reliability, we have terminated overhaul and rework of the 20+ year old C–47 and C–54. Additional procurement of CT–39's is required in future years to permit replacement of these aircraft in both the Navy and Marine Corps inventories as they are retired.

1973 FUNDING

The requested $7.9 million is for procurement of five CT–39 aircraft. An additional $0.4 million is requested for initial spares.

MODERNIZATION AND REPLACEMENT OF OLD PROP AIRCRAFT AND COST SAVINGS

Chairman ELLENDER. You will use the small planes for the same purposes as you were going to use the large ones. Is that correct?

Admiral WEISNER. To the extent that this airplane, as we said, will only carry eight to 10 passengers or an equivalent amount of cargo, the basic purpose is somewhat the same.

This would replace the C–117 and C–47 and C–54 aircraft.

Senator, none of these are new programs. It is a modernization program for replacement of the old props that we have been operating for so long and that, as I said before, sir, are very costly to maintain and operate.

Admiral McCLELLAN. There are significant cost savings. We are buying less of these aircraft than we have of the older aircraft and they are cheaper to operate. It is economically sound to modernize the force.

AIR FORCE PROCUREMENT FOR OVERSEAS ATTACHÉ SYSTEM

Chairman ELLENDER. Do you contemplate using any of these planes for use by the attaché system abroad?

Admiral MOORE. I don't believe that we have those anticipated for attachés.

Chairman ELLENDER. I understood that the Air Force purchased some of these planes for the attaché system abroad. But this is not to be used for that purpose?

Admiral McCLELLAN. No, sir; that is not in the Navy program.

T–2C BUCKEYE AIRCRAFT

Chairman ELLENDER. If there are no more questions or comments on the CT–39 Sabreliner aircraft, we will proceed with the consideration of the request of $31.3 million for the procurement of 24 T–2C Buckeye trainer aircraft. The aircraft data sheet will be included in the record.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE AIRCRAFT DATA SHEET

Service: Navy—Nomenclature: T–2C; P–1 line item No. 27, 28; popular name: *Buckeye.*

Description/Mission: The T–2C is a land or carrier based subsonic basic jet trainer. This tandem, two-place, twin engine trainer is employed in the Naval Air Training Command to train student aviators in jet flight, navigation, instrument flying, tactical and formation flight, limited weapons training, field carrier landing practice, night flying and carrier qualification.

COST DATA

[In millions of dollars]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate, total program
Procurement:										
Quantity	111	36	36	24	24	24	24			279
Cost	73.2	28.1	35.0	32.0	27.7	27.0	29.1			252.1
Less: Advance procurement, prior year	−1.7			−.7		−.4	−.4			−3.2
Net current year program	71.5	28.1	35.0	31.3	27.7	36.6	28.7			248.9
Plus: Advance procurement, current year	+1.7		+.7		+.4	+.4				+3.2
Procurement unit cost	.7	.8	1.0	1.3	1.2	1.1	1.2			.9
Weapon system cost	73.2	28.1	35.7	31.3	28.1	27.0	28.7			252.1
Initial spares	5.4	.6	1.5	.4	.9	.6	.7			10.1
R.D.T. & E										
Milcon										
Program acquisition cost	78.6	28.7	37.2	31.7	29.0	27.6	29.4			262.2
Program unit cost										.9
Total additional cost										

Note: The fiscal year 1973 request is an increment in a phased procurement plan to provide sufficient aircraft to allow retirement of older T–2A aircraft. The T–2A's are over age and plagued with engine problems. They are costly to maintain and restricted in operating performance and maneuverability, due to structural limitations in the wing and landing gear. The T–2A engine, the J–34, is no longer produced, "high tiwe" parts are approaching metal fatigue and spare parts are very difficult to obtain.

TEST DATA

[All testing has been completed]

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	North American Rockwell	Fixed price incentive.
Engine	General Electric Co	Fixed price redeterminable.

	Class	Requirement	Demonstrated
Performance:			
Maximum takeoff weight	U	13,943 lbs	13,943 lbs.
Speed/limit	U	485 knots	484 knots.
Speed/maximum/altitude	U	453 knots/25,000 ft	453 knots/25,000 ft.
Radius combat	U	465 nautical miles	465 nautical miles.
Ceiling	U	42,000 ft	32,000 ft.
Characteristics:			
Length/wing span			39.3 ft. 38.1 ft.
Engines, number/designation			2/J85–GE–4.
Ordnance			2/.50 calibre pods.
Crew			2.

END OF FISCAL YEAR 1973 FUNDED DELIVERY PERIOD

Inventory objective/requirements:	
Total operating aircraft	165
Other active aircraft	20
Total active aircraft	185
Inactive aircraft	1
Losses	21

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	119	$80.3
R.D.T. & E		
Milcon		
Total program costs	119	80.3
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	327	319.5
R.D.T. & E		
Milcon		
Total program costs	327	319.5
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	279	262.2
R.D.T. & E		
Milcon		
Total program costs	279	262.2

Note: Difference between fiscal year 1972 and fiscal year 1973 submissions: The decreased quantity of aircraft reflected in the current total program results from a reduction in the jet pilot training rate from 900 to 750 students per year and a planned reduction of 16 percent in the flying hour syllabus for each student. The reduced flying hours will be offset by increased use of T–2C flight simulator trainers.

Admiral WEISNER. The T–2C is our basic jet trainer which is capable of operating from both land bases and carriers. It is designed and equipped to train student pilots in all phases of Navy basic flight training, including instrument flying, weapons delivery, and initial carrier landing qualifications.

The fiscal year 1973 request is the fourth increment in our plan to replace all T–2A's now on hand. The T–2A's are overage, costly to maintain, and restricted in operating performance and maneuverability due to structural limitations in the wing and landing gear.

PLANNED PROGRAM AND 1973 FUNDING

One hundred eighty-three T–2C's have been procured thus far. Our fiscal year 1973 request is for $31.3 million to procure 24 T–2C aircraft

toward a planned total program of 279 aircraft. Initial spares requires and additional $0.4 million.

INCREASE IN COST

Chairman ELLENDER. I note on the aircraft data sheet that procurement unit cost for this aircraft in fiscal year 1970 and prior years was $700,000 per aircraft, in fiscal year 1971, it was $800,000 per aircraft, for 1972 it was $1 million per aircraft, and your request for fiscal year 1973 is based on $1.3 million per aircraft. What accounts for this increase in the cost of this aircraft?

Admiral MCCLELLAN. The flyaway unit cost of the aircraft increased from 682,000 in fiscal year 1970, to $762,000 in fiscal year 1971, to $820,000 in fiscal year 1972, and to $989,000 in the fiscal year 1973 request. These increases are due to economic factors. In addition, support costs have risen, primarily due to training equipment requirements. The $5,484,000 for support in fiscal year 1972 included $3,800,000 for one operational flight simulator, and the $8,250,000 for support in fiscal year 1973 includes $7,000,000 for three additional operational flight simulators.

INCREASE ON SUPPORT COST

Senator YOUNG. In fiscal year 1971, we procured 36 of these aircraft at a total cost of $28.1 million, of which $27.4 million was for flyaway cost and $700,000 was for support cost; for fiscal year 1972, we procured 36 of these aircraft at a total cost of $35 million, of which $29.5 million was for flyaway cost and $5.5 million was for support cost, and your request for 24 aircraft in fiscal year 1973 is based on $23.8 million for flyaway cost and $8.2 million for support cost. I wish you would comment generally on the reason for this increase in support cost for this aircraft, and I wish you would be specific with respect to peculiar training equipment for which $10,000 was provided in fiscal year 1972, $3,800,000 in fiscal year 1972, and $7 million is being requested for fiscal year 1973.

Admiral MCCLELLAN. The support costs significantly increased in fiscal year 1972 due to additional base outfittings required at NAS Chase and NAS Kingsville estimated at $1 million; and $3.8 million for the procurement of one operational flight simulator. This simulator will improve our training as well as reduce the costs to train in the future through reduced aircraft procurement and operating costs. In our fiscal year 1973 request there is $7 million for three follow-on operational flight simulators.

LC–130R HERCULES AIRCRAFT

Chairman ELLENDER. If there are no further questions on the T–2C aircraft, we will proceed with the consideration with the request of $31.5 million for the procurement of five LC–130R Hercules aircraft for the support of Operation Deep Freeze. The aircraft data sheet will be included in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE AIRCRAFT DATA SHEET

Service: Navy, Nomenclature: LC–130R; P–1 line item No. *31*, popular name: *Hercules.*

Description/Mission: The LC–130R is a modified version of the proven C–130

series designed for operation in the Antarctic environment. Modifications included in the budgeted costs are a ski installation to permit wheel or ski operations, T56–A–16 engines, minor changes in communications and navigation and "winterization" of certain systems.

COST DATA

[Dollars in millions]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate total program
Procurement:										
Quantity	1.0			5.0						6.0
Cost	$4.2			$31.5						$35.7
Less: Advance procurement previous year										
Net calendar year program	4.2			31.5						35.7
Plus: Advance procurement calendar year										
Procedure unit cost	4.2			6.3						6.0
Weapon system cost	4.2			31.5						35.7
Initial spares	.2			1.4						1.6
R.D.T. & E.										
Milcon										
Program acquired cost	4.4			32.9						37.3
Program unit cost										6.2
Total additional cost										

Basis for fiscal year 1973 request.—Five LC–130R's are requested in fiscal year 1973 to replace aircraft lost recently in crashes and to modernize the existing fleet which supports Operation Deep Freeze conducted by the National Science Foundation in the Antarctic. Procurement of these aircraft will provide the same level of support to this program as in previous years. Six aircraft are necessary to satisfy mission requirements. During the past two seasons, three aircraft have been lost due to accidents, one C–121J and two LC–130 aircraft, thus reducing the inventory to three LC–130's of which two will reach their design service life within the next 2 years. LC–130R's will provide a much greater safety factor, increased operational efficiency, and a notably lower mission abort rate over earlier model LC–130's currently being utilized for this purpose.

Test data.—All tests have been completed.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Airframe	Lockheed—Georgia Co	Firm fixed price.
Engines	General Motors Corp., Allison Division	Fixed price redeterminable.

	Classification	Operational requirement	Demonstrated
Performance:[1]			
Combat range	U	2,006 nautical miles	2,006 nautical miles.
Service ceiling	U	31,300 ft	31,300 ft.
Payload	U	25,024 lbs	25,024 lbs.
Combat radius/mission time	U	1000/7.47	1000/7.47.
Characteristics:			
Length/wing span	U		97.8 ft./132.6 ft.
Engines/number, designation	U		4/T56–A–16.
Takeoff weight	U		135,000 lbs.
Crew	U		7.

[1] Ski mission.

END OF FISCAL YEAR 1973 FUNDED DELIVERY PERIOD

Inventory objective/requirements:	
Total operating aircraft	5
Other active aircraft	1
Total active aircraft	6
Inactive aircraft	
Losses	

PRODUCTION DATA

Fiscal year	Quantity	Deliveries: Fiscal year—														
		1971 and prior	1972: Quarter				1973: Quarter				1974: Quarter				1975	1976	1977	1977, beyond
			1	2	3	4	1	2	3	4	1	2	3	4				
Production year:																		
1970 and prior	1																	
1971																		
1972																		
1973	5											2	3					
1974																		
1975																		
1976																		
1977																		
Balance																		
Inventory losses (during year)																		
Inventory (end of year)	1				1				1			6			6	6	6	

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	1	$4.5
R.D.T. & E.		
Milcon		
Total program costs	1	4.5
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	1	$4.5
R.D.T. & E.		
Milcon		
Total program costs	1	4.5
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	6	37.3
R.D.T. & E.		
Milcon		
Total program costs	6	37.3

Note: Differences between fiscal year 1972 and fiscal year 1973 submissions: The 5 LC–130R's requested in the fiscal year 1973 budget submission were not included in the Department of Defense 5-year defense program at the time the fiscal year 1972 budget was submitted to the Congress.

LOGISTIC AND SCIENTIFIC SUPPORT FOR OPERATION DEEP FREEZE

Admiral WEISNER. The LC–130 is a ski-equipped aircraft that is used for logistic and scientific support to the National Science Foundation (NSF) for Operation Deep Freeze.

The LC–130 has proven to be the best aircraft currently available to provide logistic support under the environmental conditions encountered in the Antarctic. The aircraft must have the capability to operate in extremely low temperatures and to make takeoffs and landings on both prepared skiways and on unprepared open snowfields.

The NSF annual logistic airlift requirement is approximately 5,500 flight hours in support of Deep Freeze operations, and six C–130 aircraft are required to provide adequate support.

INVENTORY REDUCTION

During the past two seasons, three aircraft have been lost due to accidents, reducing the Deep Freeze transport inventory to three LC–130's. Two of these aircraft have accumulated over 14,000 airframe hours and will reach their design service life within the next 2 years.

PLANNED PROGRAM AND 1973 FUNDING

The five LC–130's requested in fiscal year 1973 are required in order to provide a force level of six LC–130's, the minimum number of aircraft capable of providing the required support; $31.5 million is requested to procure the five LC–130's. Initial spares will require an additional $1.4 million.

SUPPORT OF OPERATION DEEP FREEZE

Chairman ELLENDER. I visited the South Pole recently and I observed some of the Navy's operations in this part of the world.

I understood that the Navy was being reimbursed by the National Science Foundation for your operations there. Why are you requesting funds for the purchase of these aircraft?

Admiral WEISNER. The actual procurement comes out of Navy funds, sir. The operating expenses are reimbursed to us from the National Science Foundation.

Admiral MOORE. The procurement of these aircraft is not a reimbursable item. It has been determined by the Department of Defense that the Navy would procure these with Navy appropriations, so the cost of the aircraft is not reimbursable.

AGREEMENT WITH NEW ZEALAND

Chairman ELLENDER. New Zealand is providing support to this operation. Is that to be discontinued?

Admiral MOORE. I am not aware of the extent of the New Zealand involvement, but we have had six of these aircraft in operation in the Antarctic for some time. This procurement is to replace those that have become obsolete and to continue the program.

Admiral WEISNER. Actually, Mr. Chairman, during the past two seasons three aircraft have been lost due to accidents. We lost three airplanes in the past two seasons.

Chairman ELLENDER. I was advised that we have a reciprocal agreement with New Zealand for the support of our scientific efforts there. Are you familiar with this agreement?

Admiral WEISNER. No, I am not, Mr. Chairman. I will look into the matter and provide the details for the record.

(The information follows:)

New Zealand is involved cooperatively with the U.S. to some extent in research, but to a much greater extent, and on a *quid pro quo* basis, in logistics. Throughout each austral summer's operating season New Zealanders and cargo for their Scott Base are carried to Antarctica aboard U.S. aircraft. Similarly, Scott Base cargo is carried to Antarctica aboard the MSC ship which calls at Port Lyttelton, N.Z., while en route from CONUS to Antarctica. Certain services or products (POL, Navy Exchange, etc.) at McMurdo Station are made available to Scott Base, usually on a reimburseable basis. In turn the Royal New Zealand Air Force at no cost to the U.S. provides several C–130 flights to Antarctica each year (five in FY–72; more are expected in FY–73) in support of DEEP FREEZE. The Royal New Zealand Army Transportation Corps provides approximately nine cargo handlers for a significant period to assist with operations in the DEEP FREEZE air cargo yard in Christchurch. Negotiations are currently in progress which will probably result in an additional ten New Zealand Army cargo handlers working in the McMurdo Air Cargo Yard during FY–73. New Zealand waives aircraft landing and passengers departure fees at Christchurch which are associated with DEEP FREEZE. New Zealand collects and provides weather data at Christchurch and at Campbell Island, the unique requirement for which is the U.S. air operation between New Zealand and Antarctica. New Zealand provides "Snowcraft" (survival) training to U.S. personnel at McMurdo Station at no cost.

A lease is signed by the U.S. for certain buildings in the Christchurch area and there are diplomatic agreements between the U.S. and New Zealand with respect to U.S. Forces actually in New Zealand.

However there are no formal binding agreements covering the relationship between the U.S. and New Zealand with regard to Antarctic support per se.

U.S. NAVY SUPPORT

Chairman ELLENDER. Admiral Moore, I wish you would provide for the record a statement on the number of naval personnel assigned to support this effort. I would like to have number of officers, enlisted personnel and civilians in the Navy who are occupied in this project, the total cost of the operation, as well as the reasons for the anticipated

transfer to the National Science Foundation. Please provide the pertinent information as to personnel and costs not only as of a recent date, but also the anticipated Navy costs once the project is transferred to the National Science Foundation. The costs and personnel figures should include all related operations, not only those at the base but also those in the United States, New Zealand, Australia, or elsewhere. Would you provide that?

Admiral MOORE. Yes, sir.

(The information follows:)

The total number of Navy personnel assigned to support Operation DEEP FREEZE varies because approximately 52% provide support for only 5 months each year. As of 16 March 1972, 1249 military personnel were assigned for a total FY 1972 cost of $7,555,719. The pay grades of the personnel were as follows:

Officers		*Enlisted*	
07	1	E9	6
06	3	E8	14
05	19	E7	82
04	31	E6	205
03	53	E5	279
02	19	E4	276
01	4	E3	224
W04	1	E2	28
W03	1		1114
W02	2		
W01	1		
Total	135		

On 23 December 1969 the President directed the Antarctic Policy Group (APG) to study the U. S. policy and objectives in Antarctica. This study was conducted, and the results were forwarded to the National Security Council, Under Secretaries Committee on 15 April 1970. The committee reviewed the study and forwarded its recommendations to the President on 28 May 1970. On 10 July 1970, a Presidential decision was issued which followed the recommendations of both the APG study and the committee. [Deleted.]

[Deleted.] On 4 August 1971 OMB revised OMB Circular A-51 of 3 August 1960 to incorporate this recent Executive guidance. That document, plus a DOD/NSF Memorandum of Agreement dated 23 August 1971 have led to the present relationship in which there is a modestly lower overall military profile, and NSF plays the principal role in program management.

INTERNATIONAL AGREEMENT

Chairman ELLENDER. It is my understanding that there is an internation agreement concerning Antarctica signed by 11 or 12 nations, and that Russia operates in one area at its own cost. The logistical support of the other nations is provided by the United States on a reimbursable basis. As I say, that is my understanding. I wish you would review this matter and provide a statement for the record on the extent that the United States is actually reimbursed.

Admiral MOORE. I will be happy to provide a summary for the record, Mr. Chairman.

(The information follows:)

There is no logistics program agreement exactly as described.

In the spirit of the Antarctic Treaty we cooperate with other nations to the extent that foreign scientists "piggy-back" on our support and U. S. scientists do likewise with other countries' programs. There are in fact instances where money changes hands between the U. S. and other nations, these being when a commodity is furnished. For instance, New Zealand pays the U. S. for POL

products which are provided to Scott Base by McMurdo Station. These are rare instances, and occur only where it is clearly to the best advantage of one party with no disadvantage to the other.

CIVILIAN PERSONNEL

Chairman ELLENDER. Admiral, in addition to the other information I requested, I would like to have the number of civilian personnel engaged in the support of Operation Deepfreeze, and the cost of these civilians.

Admiral MOORE. I will provide that information for the record, Mr. Chairman.

(The information follows:)

Seventeen civilian personnel are employed in support of Operation DEEP FREEZE at an annual cost of $116,000. The pay grades are listed below. GG personnel are Foreign Nationals employed in New Zealand.

U.S. Civil Service		*Foreign National*	
GS–14	1	GG–7	2
GS–5	1	GG–6	1
		GG–5	3
Total	2	GG–4	6
		GG–3	2
		GG–2	1
		Total	15

APPARENT INORDINATE NAVY PARTICIPATION

Chairman ELLENDER. While I was favorably impressed with our scientific efforts in Antarctica, the size of our support operation for a relatively few scientists concerns me. It seems to me that we are carrying the bulk of the cost of the support for all of the nations participating in the program.

(Discussion off the record.)

AIRCRAFT MODIFICATION

Chairman ELLENDER. We will now proceed to the consideration of the request of $359.2 million for the activity entitled "Modification of Aircraft," page 23 of the justifications, along with the P–1 tabulation on modification of aircraft listing each of the aircraft included in the modification program for fiscal years 1971 and 1972 and the request for 1973 will be included in the record at this point.

(The information follows:)

BUDGET ACTIVITY 5: MODIFICATION OF AIRCRAFT

(In thousands)

Fiscal Year 1973 Estimate	$359,200
Fiscal Year 1972 Estimate	435,770
Fiscal Year 1971 Actual	296,586

Purpose and Scope of Work

After an aircraft has entered service use, technical improvements which contribute substantially to its operational capabilities or safety are developed. This budget activity funds procurement costs associated with incorporation of these improvements in Navy and Marine Corps aircraft. In addition, funds are included for safety-of-flight changes required to correct deficiencies revealed during day-to-day aircraft operations.

Justification of Funds

Continuing advances in aeronautical and associated technologies make available a wide range of potential modifications to aircraft each year. These are closely examined to select those changes which increase safety-of-flight and provide essential operational capabilities on a cost effectiveness basis. The modifications chosen are then combined to establish an annual aircraft modification program which is consistent with aircraft rework schedules and the availability of necessary facilities.

The FY 1973 modification program request of $359.2 million reflects a $76.6 million decrease from the FY 1972 program of $435.8 million.

The FY 1973 aircraft modifications can be categorized as follows:

Program	*Amount*
Electronic Warfare	$65.0
Other combat aircraft modifications	144.2
Anti-Submarine Warfare	32.1
AIMS/ILS	21.5
Other aircraft	57.9
Power plant changes	13.5
Miscellaneous flight safety/field teams	25.0
	359.2

AIRCRAFT MODIFICATION P-1 LISTING

	Fiscal year—		
	1971 cost	1972 cost	1973 cost
Budget activity 5—modification of aircraft:			
A-3 series	1.0	7.0	
A-4 series	14.8	23.8	4.1
RA-5C	6.0	9.1	
A-6 series	35.7	56.9	91.5
A-7 series	19.9	23.9	6.4
AV-8A		.5	
F-4 series	19.5	54.6	46.1
F-8 series	4.6	6.1	2.9
F-9			1.3
OV-10A	.5	2.9	
CH/UH-46 A/D	3.6	4.0	25.0
CH-53 A/D	1.8	.9	4.2
UH-1 series	.8	.5	
H-3 series	26.1	26.2	23.5
SP-2 E/H	1.0	.8	
P-3 series	64.6	74.9	12.4
S-2 series	9.3	4.4	1.8
E-1B	.9	1.8	
E-2 series	.6	3.0	9.1
T-39		1.1	.3
C-2A	.3	.2	.6
C-121 series		.9	
C-130 series	7.6	12.4	16.3
H-2 series	24.8	28.2	32.2
Various	21.0	66.7	43.0
Powerplant changes			13.5
Field team installation of modernization equipment	7.8	5.0	5.0
Miscellaneous flight safety and operational necessity changes	24.4	20.0	20.0
Total, budget activity 5	296.6	435.8	359.2

Admiral WEISNER. The aircraft modification program funds incorporation of technical improvements which substantially modernize operation capabilities, improve maintenance reliability or safety and extent service life of aircraft.

In view of the limited new procurement, it is especially important that we modernize aircraft in our current inventory to meet new requirements and projected threats.

1973 Funding and Program Items

Our request for this program this year is for $359.2 million. The more significant items in the modification program include:

Combat Aircraft

Installation of an electronic warfare package designed to update radar homing and warning and DECM capability in combat aircraft. This will enable them to counter the more advanced Soviet surface-to-air missiles.

ASW Aircraft

Modernization of older ASW aircraft to incorporate advanced sensors thereby improving their capability to locate and track nuclear submarines.

A–6A Aircraft

Retrofit the less capable A–6A aircraft with the A–6E avionics and weapons release system for improved combat capability, reliability and maintainability. A total of [deleted] A–6A–to–E modifications is planned through [deleted.] This, in conjunction with planned new procurement, will give the Navy and Marine Corps an all A–6E capability by fiscal year [deleted].

F–4 and F–4B Aircraft

Continuation of the service life extension program (SLEP) for F–4B aircraft in order to meet active and reserve fighter force levels. This program will provide an additional [deleted] months of service per aircraft. A total of [deleted] aircraft is planned for the F–4 SLEP program.

AIMS Equipment

Installation of AIMS equipment in all naval aircraft. This is an identification system required by FAA for all aircraft using Federal airways after January 1973.

Carrier Aircraft

Installation of the automatic carrier landing system in carrier aircraft to improve safety during instrument flight conditions.
Configure four [deleted].

CH–46 Helicopter

Service life extension program for the older CH–46 helicopter to include an updated engine and combat improvements. Extending the service life of the CH–46 permits us to defer procurement of a new Marine Corps medium assault transport helicopter until the mid-1980's.

COMPLETION OF PRIOR YEAR PROGRAMS

Of the $359.2 million requested, $303 million is to continue or complete programs started in prior years. Only those modification programs of the utmost importance are included in this request.

PROCUREMENT OF MODIFICATION KITS: 1972 HOUSE COMMITTEE REPORT

With but few exceptions where long leadtime or a more economical procurement of a large number low-cost kits is involved, all kits are planned for installation during the fiscal year 1973/1974 time frame.

Last year, the House Appropriations Committee, in their report on the fiscal year 1972 request, considered the extent of the aircraft modification kit backlog of serious concern and indicated improved management was required.

Specifically, we were directed to review the fiscal year 1972 aircraft modification request in order to assure "nice to have" and unnecessary low priority modifications were not purchased, and to eliminate the procurement of modification kits that are beyond our capability to install during fiscal years 1972 and 1973.

The aircraft modification kit inventory backlog and kit management procedures have been under extensive review, and methods for insuring expeditious installation are being structured or implemented.

The fiscal year 1972 modification program has been reviewed and only high priority, urgently required change kits are being procured in fiscal year 1972 and requested in fiscal year 1973, and only in quantities that are within the Navy's capability to install.

1973 FUNDING REDUCTION

This year's request of $359.2 million reflects a $76.7 million decrease from our fiscal year 1972 modification program.

NUMBER OF AIRCRAFT TO BE MODIFIED IN 1973

Chairman ELLENDER. The amount of $359.2 million is a large sum. How many aircraft are involved in this?

Admiral MCCLELLAN. We will have to provide that for the record, Senator Ellender.

There are many hundreds of airplanes because nearly all in the inventory are affected to a greater or lesser extent.

(The information follows:)

$320.7 million of the FY 1973 aircraft modification request of $359.2 million are required for major modifications to approximately 1100 Navy and Marine Corps aircraft. These modifications include high cost programs such as improvement of the avionics package in 48 A–6 aircraft ($75.0 million), installation of electronic warfare equipment in fighter and attack aircraft ($65.0 million), conversion of 30 SH–2D aircraft for Light Airborne Multi-Purpose System (LAMPS) ($20.3 million), two prototypes for service life extension for CH–46 ($20.2 million) and other modifications.

The remaining $38.5 million covers the procurement and installation of lower cost modifications required for correction of unplanned flight safety and operational necessity changes in support of the total active inventory of approximately 6800 Navy and Marine Corps Aircraft.

MODIFICATION OF A–6 AIRCRAFT

Chairman ELLENDER. The request includes $91.5 million for the modification of A–6 aircraft. How much of this total is for the program to update the A–6A aircraft to the A–6E configuration that you discussed earlier, and how many aircraft will receive this modification during fiscal year 1973?

Admiral MCCLELLAN. $75 million is requested for the update of the A–6A aircraft to the A–6E configuration. These funds provide for 48 sets of hardware and installation of this hardware in 36 aircraft in fiscal year 1973. Due to production leadtime, the remaining 12 sets will be installed in fiscal year 1974.

Senator YOUNG. Please comment on the other modifications planned for the A–6 aircraft, and indicate the amount included in this total of $91.5 million for these other modifications.

Admiral MCCLELLAN. The A–6 modifications program for fiscal year 1973 includes 8 separate modifications. I will provide the details for the record.

(The information follows:)

$1.6 million for [deleted] ALQ–86 Centerline Stores
$75.0 million for conversion of 48 A–6A to A–6E
$1.3 million for procrement of 25 Tactical Communications Jammers
$1.2 million for aircraft provisions for installation of ALQ–100X in 29 aircraft
$0.7 million for aircraft provisions for installation of ALR–45/50 in 23 aircraft
$10.9 million to provide Condor Missile Delivery Capability to [deleted] aircraft
$0.3 million for Field Team Installation of AIMS (Air Traffic Control, IFF, Military Identification System) in 58 aircraft
$0.5 million for procurement of 130 ALE–29B Chaff Dispensers

MODIFICATION OF A–7 AIRCRAFT

Chairman ELLENDER. Please comment on the various modifications planned with the $6.4 million requested for the modification of A–7 aircraft.

Admiral MCCLELLAN. The A–7 modification for fiscal year 1973 includes 6 different modifications. I will provide the details for the record.

(The information follows:)

$1.0 million for an Instrument Landing System and Monitor for Automatic Carrier Landing System
$1.3 million for Tactical Communications Jammers for 25 aircraft
$1.3 million for L Shaped Probes for 488 aircraft
$2.4 million for aircraft provisions for ALQ–100X installation [deleted]
$1.3 million for L Shaped Probes for 488 aircraft
$0.1 million for Field Team Installation of AIMS (Air Traffic Control, IFF, Military Identification System) in 212 aircraft

MODIFICATION OF F–4 AIRCRAFT

Chairman ELLENDER. The request includes $46.1 million for the modification of F–4 aircraft. Comment generally on the nature of these modifications, and provide a tabulation for the record listing each of the various modifications planned for these aircraft and the amount required for each.

Admiral MCCLELLAN. The $46.1 million requested for F–4 covers

fourteen separate modifications. I will be pleased to provide a tabulation for the record.

(The information follows:)

$3.5 million for Visual Target Acquisition System for 80 aircraft
$0.9 million for modification to #7 Fuel Tank for 182 aircraft
$4.3 million for improved environmental cooling system for AWG–10 installed in 132 aircraft
$0.7 million to improve APG–59 Radar Track in 132 aircraft
$14.6 million for Service Life Extension of 56 aircraft
$1.5 million for Tactical Communications Jammer for 30 aircraft
$1.1 million for ALE–29B Chaff Dispenser for 308 aircraft
$6.9 million for Aircraft Provisions for ALQ–100X [deleted]
$3.6 million for [deleted]
$4.3 million for aircraft provisions to install [deleted]
$0.3 million to improve APG–59 Radar Clutter capability in 132 aircraft
$1.4 million for Field Team installation of AIMS (Air Traffic Control, IFF, Military Identification System) in 48 aircraft
$2.1 million for aircraft provisions for retrofit of structural fatigue improvements in 231 aircraft
$0.9 million for prototype of AWG–10 modification to improve reliability

MODIFICATION OF CH–46 HELICOPTERS

Chairman ELLENDER. $25 million is requested for the modification of the CH–46 helicopters. Comment generally on the nature of these modifications, and then provide for the record a detailed tabulation on each of the modifications planned and the amount required for each.

Admiral MCCLELLAN. The $25 million requested for the CH–46 covers four modifications. I will be glad to provide a tabulation.

(The information follows:)

	In millions
Integral spar inspection system for 136 helicopters	$4.3
Two prototypes to extend service life of these helicopters	20.2
Special support equipment for AIMS (Air Traffic Control, IFF and Military Identification System)	.4
Field Teams to install AIMS in 151 aircraft	.1

MODIFICATION OF H–3 HELICOPTERS

Chairman ELLENDER. You are requesting $23.5 million for the modification of H–3 helicopters. What is the basic mission of this helicopter?

Admiral MCCLELLAN. The basic mission of the SH–3H helicopter is to conduct offensive and defensive antisubmarine warfare (ASW) [deleted] of a force while operating from either carriers or the Sea Control Ship.

Senator YOUNG. Just what is involved in the modifications you plan with the $23.5 million requested?

Admiral MCCLELLAN. I will be happy to furnish this information for the record.

(The information follows:)

	In millions
ASQ–81 Magnetic Detecting Set for 28 helicopters	$2.0
Improved sonar for 50 helicopters	7.4
Conversion of 10 SH–3G helicopters to SH–3H configuration	12.3
Automatic flight control system reliability and coupler improvement for 21 SH–3H helicopters	1.5
Special support equipment for AIMS (Air Traffic Control, IFF, and Military Identification System)	.2
Field Team Installation of AIMS in 96 helicopters	.1

Chairman ELLENDER What additional capabilities will these modifications give these helicopters?

Admiral MCCLELLAN. These modifications will provide an improved Magnetic Detection System and improved sonar for these helicopters. [Deleted.]

MODIFICATION OF P–3 AIRCRAFT

Chairman ELLENDER. Please comment on the nature of the modifications planned with the request of $12.4 million for the P–3 aircraft.

Admiral MCCLELLAN. The P–3 modification program includes seven different modifications. I will provide the details for the record.

(The information follows:)

	In millions
Installation of Directional Jezebel Sonobuoy System Analyzer in [deleted] aircraft	$2.8
Command signal generator, ASA–76, in [deleted] aircraft	1.4
ALQ–78 ECM Set in [deleted] aircraft	3.4
TT/581/AG teletypewriter display in 83 aircraft	.7
Secure transmission acoustic data system in24 aircraft	1.6
Omega Navigation Set, ARN–99, for 36 aircraft	2.4
Field Team Installation of AIMS (Air Traffic Control, IFF, and Military Identification System) in 44 aircraft	.1

MODIFICATION OF E–2 AIRCRAFT

Senator YOUNG. Describe the modifications you plan with the $9.1 million you are requesting for the E–2 aircraft series.

Admiral MCCLELLAN. I will be happy to furnish this information.

(The information follows:)

	In millions
Improvements to ASN–36 Inertial Navigation System in 49 aircraft	$0.4
ASN–20 Crash Position Indicators for 46 aircraft	1.7
ASN–50 Attitude and Heading Reference System for 24 aircraft	.8
Hydraulically-driven 10KVA generator for 48 aircraft	.7
Inert gas fire extinguishing system for 49 aircraft	.6
Airframe fatigue tests	.7
UHF Link II Radio Set for 24 aircraft	2.1
Nonrecurring costs to improve reliability	2.1

C–130 AIRCRAFT MODIFICATIONS

Chairman ELLENDER. I note that you are requesting $16.3 million for the modification of C–130 aircraft. Comment generally on the nature of these modifications, and provide a tabulation for the record setting out each of the planned modifications and the amount required for each.

Admiral MCCLELLAN. The $16.3 million requested for the C–130 aircraft provides for seven separate modifications. I will be glad to furnish the details on these modifications.

(The information follows:)

	In millions
Modification of center and outer wing section for 10 aircraft	$2.2
Instrument landing system for 15 aircraft	.2
Modification of 4 aircraft from TACAMO III to TACAMO IV configuration	10.8
Installation of a Tactical Satellite Communication System in 5 aircraft	.3
VERDIN capability in 6 aircraft	2.5
Field team installation of AIMS (Air Traffic Control, IFF, and Military Identification System) in 7 aircraft	.1
Drogue altitude readout system in 12 aircraft	.2

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H–2 Helicopter Modifications

Chairman Ellender. You are requesting $32.2 million for the modification of SH–2D helicopters. Is this the program that is commonly referred to as the LAMPS modification program?

Admiral McClellan. Yes, sir, this is the LAMPS modification program.

Senator Young. Is this total of $32.2 million associated with the LAMPS modification?

Admiral McClellan. Yes, sir. The total of $32.2 million is the fiscal year 1973 request for the LAMPS modification program.

Chairman Ellender. Is this program related in any way to the research and development project entitled "W2118, destroyer helicopter system (LAMPS)", for which $20.7 million is requested?

Admiral McClellan. No, sir, none of the fiscal year 1973 R. & D. effort is required in support of the PAMN-funded fiscal year 1973 through 1976 LAMPS modification program. The R.D.T. & E.,N funding requested in fiscal year 1973 under project W2118, destroyer helicopter system (LAMPS), is for the follow-on program. The follow-on program is required for new production of LAMPS MK III aircraft to complete Navy inventory requirements, and does not involve this modification program.

Chairman Ellender. On February 4, 1972, the Department of Defense submitted a reprograming action to the Congress involving $15 million for this modification program, of which $13.7 million was for long lead time items for the fiscal year 1973 modification program. Is that $13.7 million in addition to the $32.2 million you are now requesting?

Admiral McClellan. As originally planned, the $13.7 million was in addition to the $32.2 million; however, as I previously mentioned, the reprograming action was denied by the House Appropriations Committee. This action required revision of the planned modification program. Justification pages outlining the revised program have been submitted for the record. The revised LAMPS modification program for fiscal year 1973 does not require the $13.7 million reprograming action.

Senator Young. As I understand the data sheet, two of these modifications were funded in 1971, 10 in 1972, and you are requesting 30 for 1973, is this correct?

Admiral McClellan. Ten were funded in fiscal year 1971; 10 in fiscal year 1972. The original request was for 30 in fiscal year 1973. The revised request which I have mentioned calls for 22 in fiscal year 1973.

Senator Young. How many of these helicopters do you intend to modify?

Admiral McClellan. The Navy intends to modify [deleted] H–2 aircraft.

Chairman Ellender. What is the total estimated cost of the modification of these [deleted] helicopters?

Admiral McClellan. Modification of the [deleted] H–2 helicopters from fiscal year 1971 through 1976 programs is estimated to cost, in constant fiscal year 1972 dollars, [deleted].

Ship Deployment of LAMPS Helicopters

Chairman Ellender. Once these helicopters are modified, what type of ships will they be deployed on, and what is the total number of these ships that you expect to put these modified helicopters on?

Admiral McClellan. These helicopters will be deployed on DLG 26 class guided missile frigates; DLGN 35 nuclear powered guided missile frigate; DE 1040/1052 class ocean escorts; and DEG1 class guided missile ocean escorts. There are a total of 72 ships in this group.

Senator Young. Does this program involve any substantial alterations to these ships?

Admiral Weisner. I would like to furnish this information for the record.

(The information follows:)

The following alterations to these ships are required:

(a) Installation of data link receivers and processors;

(b) Installation of distance and azimuth measurnig equipment (DAME) for helicopter navigation;

(c) Enlargement of existing unmanned helicopter hangars to accommodate the larger manned LAMPS helicopters;

(d) Additional personnel accommodations for the helicopter crews and maintenance personnel;

(e) Provisioning of deck marking, lighting, safety nets, et cetera, for the operation of manned LAMPS helicopters.

Not all of these alterations are required for each class of ship.

Miscellaneous Modifications

Chairman Ellender. On line 56 of the P–1 Exhibit, there is a request of $43 million for "Various modifications". Please comment on this request.

Admiral McClellan. These funds provide for procurement of five different modifications which apply to many models of aircraft. I will provide the specific programs for the record.

(The information follows:)

	In millions
Aircraft provisions for AIMS (Air Traffic Control, IFF, and Military Identification System) for 284 aircraft	$1.0
AIMS equipment for 516 aircraft	7.4
Installation of AIMS in 516 aircraft	1.5
100 high capacity chaff dispensers	1.7
Modification to [deleted] ALQ–100 ECM Sets	31.4

Power Plant Changes

Chairman Ellender. Please comment on the request of $13.5 million set out on line 57 of the P–1 Exhibit entitled "Power Plant Changes."

Admiral McClellan. This $13.5 million is required for procurement of kits for modification of aircraft engines, propellers, and related equipment to improve reliability, performance and durability.

Chairman Ellender. I note in the P–1 Exhibit that no funds were provided for this program during fiscal years 1971 and 1972. Is this a new program?

Admiral McClellan. This is a new program to the modification of aircraft (budget activity 5) but not to the procurement of aircraft and missiles, Navy, (PAMN), appropriation. This program, prior to fiscal

year 1973, was budgeted under activity 6, aircraft replenishment spares program.

Chairman ELLENDER. Just how does this program differ from the component improvement program for which $58 million is requested under budget activity 7?

Admiral MCCLELLAN The component improvement program included in PAMN budget activity 7, finances engineering effort leading to improvements in aircraft engines, propellers and related equipment. The power plant modification program in budget activity 5 funds the procurement of hardware to implement the changes engineered under the component improvement program.

FIELD TEAM INSTALLATION

Chairman ELLENDER. Just what is involved in the request of $5 million for "Field Team Installation of Modernization Equipment?"

Admiral MCCLELLAN. This $5 million covers the cost of technically qualified teams who install hardware procured under this activity. These highly skilled teams install flight safety and operational necessity changes which are beyond the capability of operating squadrons to incorporate and due to their urgent nature cannot be deferred until normal rework period of the affected aircraft.

FLIGHT SAFETY AND OPERATIONAL NECESSITY CHANGES

Senator YOUNG. Give us several examples of the types of modifications you plan with the $20 million requested for "Miscellaneous Flight Safety and Operational Necessity Changes."

Admiral MCCLELLAN. The $20 million for miscellaneous flight safety and operational necessity changes provides for immediate correction of deficiencies revealed during day-to-day aircraft operations, which, if uncorrected, could ground the aircraft and prevent further operational use. These discrepancies are unforeseeable and we cannot anticipate which aircraft or component thereof will fail in usage under service conditions. However, we can anticipate that about $20 million will be required to correct the troubles which will occur if fiscal year 1973 conforms to past experience.

I will be pleased to furnish for the record examples of types of modifications we have funded in fiscal year 1972 with this $20 million.

(The information follows:)

Kits for A–6 aircraft to provide modification of Main Landing Gear Forward Door Hook to prevent door from jamming in the up position (350 kits, $240,000).

Kits for C–2 aircraft to modify Cargo Tract to prevent shift of cargo on catapult launch (15 kits, $111,000).

Kits for P–3 aircraft to install lightning proof fuel caps to prevent lightning strike from igniting fuel vapor in the wing tanks and causing an explosion (307 kits, $33,000).

Kits for A–7 aircraft to provide an improved canopy restraint strap for 2500 pound breaking strength in lieu of the present 600 pound to alleviate the canopy strap failures (281 kits, $8,600).

Kits for E–2 aircraft to provide dimming provisions for indicator lights to prevent hazardous glare and interference with pilot vision during night approaches (48 kits, $12,400).

OMEGA NAVIGATION SYSTEM

Chairman ELLENDER. Does your request for modification include any funds for the modification of aircraft to give them the capability

to use the new Omega navigational system, and if so, name the aircraft, the number, and the total requested for this effort.

Admiral McCLELLAN. I will be glad to furnish this information.

(The information follows:)

CH–46, 2 aircraft	$100,000
P–3B, 36 aircraft	2,400,000

AIRCRAFT SPARES AND REPAIR PARTS

Chairman ELLENDER. If there are no further questions on the modification program we will proceed with consideration of the request for $460.4 million for the budget activity entitled "Aircraft Spares and Repair Parts." Pages 35 and 36 of the justification will be included in the record.

(The information follows:)

Budget activity 6: Aircraft spares and repair parts

Fiscal year 1973 estimate	$460,400,000
Fiscal year 1972 estimate	482,281,000
Fiscal year 1971 actual	448,542,000

Purpose and scope of work

Funds are budgeted under Activity 6 for the procurement of spare equipments and repair parts to support Navy and Marine Corps aircraft procurement and operating programs. The budgeted funds provide for: (1) initial outfitting and pipeline quantities of reparable spare and repair parts for new and modified aircraft; and (2) procurement of reparable spare equipments and repair parts to replenish inventories supporting the operating and flying-hour program for aircraft already in the Fleet.

Justification of funds

The fiscal year 1973 request of $460.4 million includes $336.4 million for initial (or investment) spares and repair parts and $124 million for the replenishment program. The following table depicts major differences between the fiscal year 1972 and fiscal year 1973 programs.

[In millions of dollars]

	Fiscal year—	
	1972	1973
Total	482.3	460.4
Initial	338.1	336.4
Support of new aircraft	281.8	285.4
Support of aircraft modification program	56.3	51.0
Replenishment	144.2	124.0

Investment requirements are determined by the number, type, and deployment of aircraft being procured and entering the operating program. While investment spares are in support of the end items procured in other PAMN budget activities, actual budgeting and procurement is scheduled in the fiscal year in which the contract must be let to meet operating support requirements. Requirements for engines, major avionics equipments, and other equipments with a significant unit cost are calculated on an item-by-item basis, considering usage data and failure rates, or by utilizing engineering estimates of predicted usage for new components. Requirements for other investment spares and spare parts are calculated on a statistical basis, using the same criteria used for calculating major spare equipment requirements. The FY 1973 increase of $3.6 million in investment spares for support of new aircraft results from increased S–3A and

EA–6B support requirements which are partially offset by reduced F–14A and P–3C requirements.

Initial spares and repair parts for support of new aircraft can be categorized as follows:

(1) *Government Furnished Spare Aircraft Engines ($52.6 million).*—Spare aircraft engine requirements are calculated on an actuarial basis to support the aircraft operating program with a confidence level of 80–90% that a spare engine will be on site and ready for issue when required. These spare engines are for the following purposes: (a) provide for initial outfitting of shore sites and carriers; (b) fill maintenance repair/overhaul pipelines; and (3) provide replacement for an installed engine that is not functioning properly or has reached its maximum authorized operating time.

(2) *Other Government Furnished Equipment (GFE) Spares ($20.4 million).*—This category includes spare equipments of aeronautical GFE for which the Naval Air Systems Command headquarters must retain engineering management and, hence, procurement responsibility. These equipments are generally those which are subject to design changes either because they are related to new aircraft programs or because of the likelihood of incorporating improvements in the equipments. These equipments, along with spare engines and Navy support material, represent the assets necessary for meeting initial outfitting and pipeline requirements.

(3) *Contractor Support ($51.2 million).*—Prime contractor furnished material and repair services are provided for support of new, sophisticated weapon systems during their development, test and fleet introductory phases until Navy Support Date (NSD), at which time the Navy supply system assumes responsibility for providing all spares and spare parts. This contractor support is designed to preclude procurement of unnecessary or unusable spare parts before usage data is available or aircraft equipment design is frozen. Contractor support includes initial outfittings at test and deployment sites, material replacement, material management, and provisioning services.

(4) *Navy Support ($139.0 million).*—The Aviation Supply Office (ASO) must purchase investment spares and repair parts under its management cognizance to initially outfit shore sites and carriers and back-up system pipeline stock in support of new or additional aircraft, engines or installed systems. Navy support responsibility commences at the beginning of a new program for GFE and at the Navy Support Date for prime contractor material.

(5) *Peculiar Ground Support Equipment (PGSE) ($22.2 million).*—This category includes spares and spare parts to support new and in-use peculiar ground support equipment at shore stations and on carriers.

Procurement of Space Components

Admiral Weisner. Funds requested in this budget activity are for the procurement of spare equipments and components to support Navy and Marine Corps aircraft—both new procurement and those now in service use.

The requested funds include:

(1) Initial spares—initial outfitting and pipeline quantities of repairable spare components for new and modified aircraft entering our operating inventory; and

(2) Procurement of repairable spare components to replenish inventories supporting the operating and flying hour program for aircraft already in the fleet.

Aircraft Squadron Readiness

Spares requirements are directly related to operations as well as to the numbers and types of aircraft. This in turn relates to aircraft squadron readiness—the squadrons' ability to perform their primary missions.

In both the Atlantic and Pacific fleets readiness, in terms of supply parts availability, has worsened. The average number of aircraft grounded for lack of parts has increased by approximately 50 percent

in the past 5 years. Close to 20 percent of the operating aircraft inventory is not fully mission ready due to material shortages—about 1,225 aircraft. Most of the shortages are for repairable spares. The Navy objective is to reduce this figure to seven—10 percent.

PRIORITY FUNDING REDUCTIONS

Chairman ELLENDER. Who is to blame for that situation?

Admiral WEISNER. We have asked for more money; we have tried to have additional funds in our budget for these items, Mr. Chairman, in the past, but whenever we have placed this in a priority listing against what we could fund, we have found that this is one of the areas that has been cut fairly severely.

Chairman ELLENDER. Who cut it?

Admiral WEISNER. We have done part of it to ourselves in the Navy and there have been some other reductions in the Defense Department, sir.

Chairman ELLENDER. Proceed.

1973 FUNDING LEVEL REDUCTION

Admiral WEISNER. Our budget request for aircraft spares is tightly structured this year due to overall fiscal constraints and is down $22 million from our fiscal year 1972 request.

The high percentage of aircraft that are not operationally ready due to lack of spare parts is of major concern. Adequate spares support is essential if aircraft are to be used effectively and efficiently.

I do not predict any pregress toward reducing this figure in fiscal year 1972—I feel that we will be fortunate to hold the line at the current level.

In summary, we are requesting $336.4 million for initial investment spares, and $124.0 million for replenishment spares.

INITIAL SPARES

Chairman ELLENDER. Admiral, as we discussed each of the aircraft in your request there were references to funds for the procurement of initial spares. Are those funds part of this total?

Admiral MCCLELLAN. Yes, sir. This request includes $285.4 million for the procurement of initial spares for the support of new aircraft.

REPLENISHMENT SPARES

Chairman ELLENDER. Under aircraft modification you have $51 million, and for replenishment spares, $124 million?

Admiral MCCLELLAN. Yes, sir.

REDUCTIONS OF ORIGINAL BUDGET SUBMISSIONS

Chairman ELLENDER. I cannot understand why you fell so far behind on spares. Isn't this an indictment against yourselves?

Admiral WEISNER. In 1971, for example, Mr. Chairman, the Navy submission was reduced $94.7 million. In 1972, it was reduced by $9.1 million. Going further back to other years, there have been similar if not greater reductions.

POSSIBLE REPROGRAMING OF FUNDS FROM SPARE PARTS ACCOUNTS

Chairman ELLENDER. There is no good reason why aircraft should be forced to remain grounded because of lack of spares. Please furnish the committee with any instances wherein, through reprograming, funds have been taken from spares for some other purpose.

Admiral WEISNER. Yes, sir.

Chairman ELLENDER. Please be specific about it.

Admiral WEISNER. We will do that, sir.

(The information follows:)

Differences between the appropriated amount and the current program for aircraft spares and repair parts in fiscal years 1968 through 1972 are shown below:

	Appropriated	Current program [1]	Difference
Fiscal year:			
1968	[2] $578.1	$589.4	+$11.3
1969	368.6	359.5	−9.1
1970	507.0	519.2	+12.2
1971	438.9	448.5	+9.6
1972	492.7	482.3	−10.4
Total			+13.6

[1] Reflects fiscal year 1973 congressional budget submission and the Dec. 31, 1971 DD 1416 report.
[2] Includes supplemental appropriation transfer from the SEA emergency fund.

The overall difference for the 5-year span is a net increase of $13.6 million above the amount appropriated.

GAO REPORT ON PROCUREMENT OF INITIAL SPARES

Chairman ELLENDER. On January 31, 1972, the Comptroller General submitted to Congress a report entitled "System for Buying Spare Parts for Initial Support of New Military Aircraft Needs Substantial Improvement, Department of the Air Force". Are you familiar with this report?

Admiral MCCLELLAN. Yes, sir, I am.

Chairman ELLENDER. I wish you would review this report and provide a statement for the record setting out the Navy's practice with respect to the following points: (1) Requirement for realistic aircraft delivery documentation to those responsible for procuring initial spares; (2) require the use of available flying experience and spare parts usage data in evaluating whether further procurement of spares is necessary; (3) consideration be given to the procurement of initial spares directly from the manufacturer of the spare part, rather than through the prime contractor.

Admiral MCCLELLAN. I will be happy to do so.

(The information follows:)

Planning data by aircraft model is published in WSPDs (weapon systems planning documents) and is provided to those responsible for procuring initial spares for the purpose of computing requirements. The following items of planning data contained in WSPDs are the most significant for determining initial spares: Aircraft deliveries, number "operation" at any given time, phased site activations and quantities of aircraft assigned to each, and flying hour utilization. These WSPDs are updated when significant changes occur, or at a minimum for each fiscal year budget submission. At these updates not only are planning data reviewed but actual data are cited when available. Aircraft approved for procurement in a fiscal year normally have an 18-month manufacturing lead-time and are

then delivered during the following calendar year. However, the initial spares budget request for a fiscal year is limited to 1 year's support for those aircraft planned for operation in the first 9 months of the delivery period. Initial spares support for aircraft to be delivered and assigned to sites in the last quarter is included in the budget for the following fiscal year. Therefore by (1) continuously updating WSPDs that show planned aircraft deliveries and (2) limiting spares procurements to 1 year's support for only those aircraft approved for procurement that would be delivered and operating in the first 9 months, the Navy guards against over-procurement of spares.

Initial spares support for aircraft procurement programs is phased as follows:

a. Contractor Support.—Covers early stages of the acquisition of a new weapon system. It provides limited investment in initial spares during initial trials and pre-fleet deployment operations. It is accomplished by establishing a Support Material List (SML) containing the range and depth of initial spares/parts phased by fiscal year. The SML is contractor-recommended and Navy-approved. The contractor is required to record initial spares usage data for Navy consideration in initial provisioning and follow-on Navy initial spares support.

b. Navy support.—Follows contractor supply period. Requirements are procured by the Navy in fiscal year increments tailored to support operations scheduled for the period ending leadtime after the end of the fiscal year in which the procurement is made. Spare parts usage data for actual flying hour experience developed under the contractor test and support program is used in establishing the replacement factors which are used in initial provisioning and buy computations as soon as available. Furthermore Navy supply system stock requirements computed after 18 months of Navy support experience are based on reported system demand and replacement action rather than provisioning estimates. Assets from fiscal year procurements are considered in subsequent fiscal year buy computations.

It is the Navy policy to procure subsystems, components, and spare parts directly from their manufacturers rather than through the weapon system prime contractor. Under this policy, the appropriate Navy inventory control point (ICP) conducts provisioning with and makes procurements directly from the vendor having design control over the equipment. Navy spares contracts for initial support contain design change clauses to insure that production changes affecting aircraft being procured are automatically incorporated in spares procurements.

AIRCRAFT SUPPORT EQUIPMENT AND FACILITIES

Chairman ELLENDER. If there are no further questions on aircraft spares and repair parts we will proceed with the consideration of the next item, which is the request of $220.9 million for the budget activity entitled "Aircraft support equipment and facilities." Pages 40 and 41 of the justifications will be included in the record at this point.

(The information follows:)

BUDGET ACTIVITY 7: AIRCRAFT SUPPORT EQUIPMENT AND FACILITIES

[*In thousands*]

Fiscal year 1973 estimate	$220,900
Fiscal year 1972 estimate	196,700
Fiscal year 1971 actual	212,905

Purpose and scope of work

The fiscal year 1973 budget plan of $220.9 million provides continuing effort in five vital categories which support aircraft procurement programs. These support programs are:

(1) Common ground equipment, which provides funds for the versatile avionics shop test (VAST) system, various aircraft system trainers and training aids, the maintenance information automated retrieval system (MIARS), the carrier aircraft maintenance support improvement program (CAMSI) and other aircraft ground support equipment, including mobile maintenance facilities for Marine expeditionary forces.

(2) Component improvement, which funds the engineering effort necessary to improve the performance, reliability and maintainability of aircraft engines, as well as to correct deficiencies which are revealed through fleet operations. This project also funds the effort necessary to improve starters and starting systems, propellers and propeller systems, and electrical power systems.

(3) Aircraft industrial facilities, which finances the construction of additional production facilities and modernization and maintenance of government-owned facilities necessary for the efficient production and rework of aircraft. This project also provides for calibration equipment for Navy standards and calibration laboratories.

(4) War consumables, which provides funds for auxiliary fuel tanks, pylons, and ejector racks. These items are of a consumable nature and are related primarily to the number of sorties flown by combat or training aircraft.

(5) Other production charges, which provides funds for miscellaneous production support and testing services, aircraft cameras, various equipment for U.S. Coast Guard aircraft, ground support equipment for aircraft not in the current procurement plan and first destination transportation charges.

Justification of funds

Funding requirements for fiscal year 1973 are outlined in the following table:

[In millions of dollars]

	Fiscal year 1972 funding	Fiscal year 1973 funding	Net change
Common ground equipment	97.7	108.4	+10.7
Component improvement	43.0	58.0	+15.0
Aircraft industrial facilities	28.2	28.2	
War consumables		.9	+.9
Other production charges	27.8	25.4	−2.4
Total	196.7	220.9	+24.2

Admiral WEISNER. The fiscal year 1973 budget request of $220.9 million provides continuing effort in five categories that support our aircraft procurement programs. These support programs are:

COMMON GROUND EQUIPMENT

Common Ground Equipment ($108.4 million) which funds the Versatile Avionics Shop Test (VAST) System, Aircraft System Trainers and Training Aids, the Maintenance Information Automated Retrieval System (MIARS) and other aircraft ground support equipment including mobile maintenance facilities for Marine Expeditionary Forces.

1972–73 COMMON GROUND EQUIPMENT ITEMS

Chairman ELLENDER. Please provide a tabulation for the record setting out each of the categories of items included in the request of $108.4 million for common ground equipment, along with the items included in the fiscal year 1972 program.

Admiral MCCLELLAN. I will be happy to supply this information.

(The information follows:)

[Dollars in thousands]

	Fiscal year 1972 estimate	Fiscal year 1973 estimate
1. Versatile avionics shop test (VAST) system	$70,200	$65,100
2. General training equipment	8,300	15,600
3. Aircraft ground support equipment	10,100	10,300
4. Mobile maintenance facilities (VANS)	2,000	2,000
5. ICP managed GSE		10,500
6. Maintenance information automated retrieval system (MIARS)	5,200	3,000
7. Carrier aircraft maintenance support improvement program (CAMSI)	1,900	1,900
Total	97,700	108,400

MOBILE MAINTENANCE FACILITIES

Senator YOUNG. Just what do you expect to procure with the $2 million requested for mobile maintenance facilities?

Admiral MCCLELLAN. The $2 million requested in fiscal year 1973 will procure 112 static converters for use in mobile maintenance facilities.

Chairman ELLENDER. The request includes $10.5 million for what appears to be a new item entitled "Aviation supply office ground support equipment." What is the nature of the equipment to be provided with this $10.5 million and why has the funding for this activity been transferred from budget activity six?

Admiral MCCLELLAN. This program includes the replenishment or replacement of handling and servicing equipment required for the test, checkout and maintenance of aircraft and missile. The requirements are generated as a result of wearout and attrition; increased quantities for augmentation of allowance for out-of-production aircraft and missiles only; and new generation common ground support equipment for site outfittings.

Prior to fiscal year 1971, this budget item was in the OPN appropriation. Beginning in fiscal year 1971, it was included in budget activity six, replenishment spare parts budget. However, since these equipments are principle end items and as such are not conducive to the same requirement calculations as spare parts, it was considered to be more appropriately a budget activity seven item.

INFORMATION RETRIEVAL SYSTEM

Senator YOUNG. Please comment on the request for $3 million for the Maintenance Information Automated Retrieval System.

Admiral MCCLELLAN. The $3 million requested in fiscal year 1973 will be used to procure 1,800 items of viewing and printing equipment for the Maintenance Information Automated Retrieval System.

Senator YOUNG. Just what is involved in the request for $1.9 million for the carrier aircraft maintenance support improvement program?

Admiral MCCLELLAN. The primary objective of the CAMSI program is to develop, coordinate and integrate plans and programs designed to improve the material readiness of aircraft operating from deployed carriers and to insure that the improved state of readiness is sustained. To effect these improvements, $1.9 million is requested for avionics equipment reliability and maintainability improvements. Funds will be utilized for prototype procurement and operational testing of improvements. Any subsequent procurement of kits or new equipments will be borne by the aircraft modification, procurement, or spares programs as appropriate.

COMPONENT IMPROVEMENT

Component improvement ($58.0 million) which funds the engineering effort to improve performance, reliability and maintainability of aircraft engines and associated systems, as well as to correct unforeseen deficiencies that are revealed during fleet operations.

COMPONENT IMPROVEMENTS

Chairman ELLENDER. The next category under "Aircraft support equipment and facilities" is a request of $58 million for component improvements. The tabulation appearing on page 53 of the justifications listing each of the engines and aircraft involved in this program will be included in the record at this point.

(The information follows:)

Component improvement $58 million

$58 million is budgeted in fiscal year 1973 for engineering effort leading to reliability, performance, and durability improvements in aircraft engines, propellers, and related equipment. Funding requirements by engine model for fiscal year 1973 are as follows:

Engine model and aircraft installations:	*Amount*
TF34–GE–2, S–3A	$15,000,000
TF30–P–6/8/12/408/412, A–6A/B, F–14A	11,500,000
F402–RR–401, AV–8A	5,000,000
J52–P–6/8/408, A–4, A–6, EA–6A/B	5,000,000
TF41–A–2, A–7E	4,800,000
T58–GE–8/10, CH–46, UH–46, SH–3, H–2	2,400,000
T64–GE–6/413, CH–53A/D, RH–53D	2,200,000
T400–CP–400, AH–1J, UH–1N	1,800,000
T56–A–7/8/9/10/14/16, P–3A/B/C, C–2, E–2, C–130	1,500,000
J79–GE–8/10, F–4B/J, RA–5C	1,300,000
J65–W–16/20/416/420, A–4C/L	1,200,000
J57–P–4/6/10/16/20/22/420, F–8, A–3	900,000
T76–G–10/12, OV–10A	800,000
J85–GE–4, T–2C, T–38A	500,000
R1820, R3350, H–34, C–1A, S–2, C–121	500,000
T53–L–11/13, UH–1E, L, TH–1E	250,000
J34–WE–34/36/38, P–2, T–2A	100,000
J48–P–8, F–9	80,000
Starters	1,070,000
Propellers and gearboxes	1,000,000
Electrical power systems	1,100,000
Total	58,000,000

Chairman ELLENDER. On page 53 of the justifications, I note the following statement: "$58 million is budgeted in fiscal year 1973 for engineering efforts leading to reliability, performance, and durability improvement in aircraft engines, propellers, and related equipment." Just what is meant by the term "engineering efforts", and why isn't this more properly included in the request for research and development?

Admiral MCCLELLAN. The term "engineering efforts" is used to describe the development refinements that must be carried out on a continuing basis after an engine has successfully completed a 150-hour endurance test and certain other prescribed component and environmental tests and is approved for production. It is possible, of course, to extend the engine development cycle so that some of the development refinements could be discovered and corrected prior to production release. However, many problems and particularly those related to the installation effects, operational usage effects and production methods and practices would still remain for correction after production is underway. It is concluded, therefore, that the current practice, which is

a compromise aimed at attaining early availability of a reasonably satisfactory engine, is sound from the standpoint of both operational capability and economics. In addition, since this engineering effort occurs on engines in production it has been historically included as a line item in the PAM, N budget and it is considered proper to continue to do so.

Chairman ELLENDER. I wish you would explain again how this request for $58 million differs from the request for $13.5 million included in the modification request for "Powerplant changes."

Admiral MCCLELLAN. The $58 million for the component improvement program differs from the request of $13.5 million included in the modification request for "Powerplant changes" in the following manner:

The $58 million will be used to buy engineering effort (man-hours an test hardware), subsequent to completion of development and release to production, directed toward improvement of the engines within the limits of the engine model specification. These improvements include the correction of installation and operational problems and the improvements in durability, reliability, maintainability, serviceability and producibility.

The $13.5 million will be used to buy hardware required for incorporating the changes developed under the component improvement program in existing engines.

S–3A AIRCRAFT ENGINE

Chairman ELLENDER. I note that the largest request is $15 million for work on the engine to be installed in the S–3A Viking ASW aircraft. In commenting on this request on page 57 of the justifications, the following statement is made: "This engine is scheduled for qualification in May 1972 and production delivery in mid-1972. Engineering support is required to correct engine discrepancies normally revealed during initial flight tests scheduled to start in early 1972. New problem areas are expected for this engine since it is the first high bypass turbofan engine to enter service use." Just why is it necessary to have this engineering effort on a completely new engine?

Admiral MCCLELLAN. It is the practice of the Navy and all the military services to release aircraft engines to production on completion of a 150-hour endurance test at sea level conditions and certain other prescribed component and environmental tests. At this stage, the engine does not represent a fully and completely developed engine. This is done with full knowledge that further improvements must be continually accomplished since unanticipated problems occur, and it is often through production/operational use that other discrepancies surface. Engine discrepancies fall into two categories: (1) those covered by contractual specifications and (2) those discrepancies which the Government is unable to specifically anticipate and therefore cannot cover in the development contract. Those discrepancies in the first category are corrected at contractor's expense. Those discrepancies in the second category are investigated, defined and corrected through the component improvement program.

VERSATILE AVIONICS SHOP TEST

Chairman ELLENDER. $65.1 million is requested for the procurement of the Versatile Avionics Shop Test (VAST) system. Please describe this system. How many of these systems will be procured with the $65.1 million requested for fiscal year 1973, and indicate what aircraft these systemse will support and where they will be located?

Admiral MCCLELLAN. VAST is a general purpose computer-controlled electronic test system. It provides the wide range of stimulus and measurement capability necessary to test a broad spectrum of avionics. We will use it in intermediate level avionic shops afloat and ashore to test failed avionics components from the F–14A, E–2C, and S–3A. We will also use it at the depot level to test some components from the A7E as well as from the F–14A, E–2C and S–3A. Sixteen AN/USM–247(V) VAST systems will be procured with $65.1 million requested. Eight of these systems will be installed in aircraft carriers for common support of F–14A, E–2C, and S–3A aircraft. Three are destined for the Aircraft Maintenance Departments of Naval Air Stations Oceana, North Island and Quonset Point for support of F–14A and S–3A aircraft. One will be used by the Naval Air Maintenance Training Detachment at NAS North Island for S–3A training. The remaining four systems will be distributed among the Naval Air Rework Facilities at Norfolk, North Island, and Quonset Point for depot support of the F–14A, E–2C, and S–3A aircraft, respectively.

Senator YOUNG. It is my understanding that 46 of these systems have been procured through fiscal year 1972. Am I correct about this?

Admiral MCCLELLAN. Yes, sir. On December 30, 1971 the fiscal year 1972 contract for 16 VAST systems was awarded, bringing the total under contract up to 46.

Chairman ELLENDER. What was the total cost of these 46 systems?

Admiral MCCLELLAN. The total cost of these systems, including all development, engineering, support and spares cost programed to date is $254.1 million.

Chairman ELLENDER. Under your current plan, how many of these systems do you intend to procure, and what is the total estimated cost of these systems?

Admiral MCCLELLAN. Our current plan calls for a total of 86 VAST systems for a total program cost of $443.6 million. In addition, avionics test program sets, unique elements of the total VAST system, are being developed and procured under appropriate line items of the F–14A, E–2C, S–3A, and A–7E aircraft contracts at a total cost in the aggregate of $224.8 million.

Chairman ELLENDER. On page 43 I note that two of these systems are intended for the attack carrier designated No. 3, three are intended for the attack carrier designated No. 4, and three are for the attack carrier designated No. 5. Could you give us the names of these carriers, and indicate the aircraft that will be supported by each of these systems being procured for these particular attack carriers?

Admiral MCCLELLAN. Our total program provides for equipping each of 12 large carriers with three AN/USM–247(V) systems. These will be used to support F–14A, E–2C, and S–3A aircraft when

aboard. I will be happy to furnish the names of the carriers presently planned to receive those VAST systems which have been authorized or requested.

(The information follows:)

Aircraft carrier	Number of VAST systems	Fiscal year of VAST procurement
No. 1 USS Enterprise CVAN-65	3	1972
No. 2 U.S.S. Kennedy CVA-67	3	1972
No. 3 U.S.S. Kitty Hawk CVA-63	1	1972
	2	1973
No. 4 U.S.S. America CVA-66	3	1973
No. 5 U.S.S. Saratoga CVA-60	3	1973

Senator YOUNG. I think it would be well if you would provide for the record a statement giving a full description of this equipment, indicating the total manpower and space savings that will be realized from the installation of this equipment, especially on the attack carriers.

Admiral MCCLELLAN. Yes, sir.

(The information follows:)

The AN/USM-247(V) VAST system is a computer controlled, general purpose test system providing the broad range of stimulus and measurement capability required for automatically testing and trouble shooting avionics equipment removed from supported aircraft. VAST is comprised of three major subsystems: (1) digital computer subsystem, (2) data transfer unit and (3) stimulus and measurement section. The general purpose computer interfaces with magnetic tape transport units (MTTU) and the data transfer unit (DTU). It directs diagnostic testing and branching during test routines. Two magnetic tape transport unit (MTTU) permit rapid access to the avionic test programs and to the operating system. The DTU serves as the operator-machine interface by synchronizing instructions and data flow between the computer and the stimulus and measurement section. It also contains display and control panels. The stimulus and measurement consists of a group of independent, standardized, general purpose test modules (called building blocks). Each building block contains the circuitry necessary for performance of its function (e.g., signal generation, measurement, etc.) plus special logic circuitry to allow input and output parameters to be programable. Testing is accomplished on VAST by means of connecting the unit under test (UUT) to VAST through an interconnection device.

The following tabulation indicates scheduled commencement of support for avionic aircraft equipments of systems to be supported:

Aircraft System	*Date*
A–7E	March 1972—Support limited to VAST system test and evaluation only.
F–14A	February 1973.
E–2C	May 1973.
S–3A	October 1973.

Production systems are required at weapon system prime aircraft manufacturers' facilities early in the avionics development phase for verifying the integration of avionic test program sets and for acceptance testing of the avionics. The first AN/USM-247(V) system was delivered to Grumman Aerospace Corporation, Bethpage, New York on December 31, 1970.

The Navy expects to realize savings in manpower and in space from what would otherwise be required without VAST. Most recent estimates of comparative space requirements in aircraft carriers indicate that avionic shop space in excess of 4,000 square feet would be required for conventional support equipment necessary to the same job as VAST. The standard three-system VAST complex requires 2,700 square feet, a spacesaving of approximately one-third. Manpower estimates based on computer simulations of A7E/VAST operations have indicated

a manpower reduction in the avionics shop from 22 men now required to 14 men using VAST. However, we as yet have collected insufficient operating data to validate this projection.

GENERAL TRAINING EQUIPMENT

Chairman ELLENDER. Please provide for the record a tabulation setting out each of the items included in the $15.6 million being requested for general training equipment.

Admiral MCCLELLAN. I will be glad to do so.

(The information follows:)

	Fiscal year 1973 (thousands)
Device 2B18A Helo Basic Instrument Trainer	$1,000
Device 2D2 EW Tactical Training Complex	2,600
Device 9A15 High Altitude Rapid Decompression Chamber	1,050
Device 9E6 Universal Ejection Seat Trainer	200
Device 15G14 Ground Controlled Approach Trainer	100
Device 1D23 Communication/Navigation Trainer	400
Device 15G19 GCA Target Generating Complex	1,000
Training Aids and Devices	1,000
Modification of Training Devices	950
Modification/Modernization of Trainers	7,300
Total	15,600

Senator YOUNG. I note that only $8.3 million was provided for this general training equipment during fiscal year 1972. Just what accounts for this increase of $7.3 million requested for fiscal year 1973?

Admiral MCCLELLAN. This increase is due to the fact that $7.3 million of modernization/modification of trainer funds formerly budgeted in the other production charges is now budgeted under the trainer program.

AIRCRAFT GROUND SUPPORT EQUIPMENT

Chairman ELLENDER. Of the total requested for common ground equipment, $10.3 million is for aircraft ground support equipment. Please provide a tabulation for the record setting out each of the items included in this request, along with the cost for each of the items.

Admiral MCCLELLAN. I will be happy to do so.

(The information follows:)

Detailed Requirement:	*(Dollars in thousands)*
Propulsion Support Equipment	$2,350
Weapons Packaging and Handling Equipment	915
Electrical Servicing Equipment	720
Fluid Servicing Equipment	2,375
Miscellaneous Aircraft Support Equipment	3,940
Total	10,300

Chairman ELLENDER. Does this request of $10.3 million for ground support equipment include funds for any items that have not been procured in prior fiscal years, and if so, please comment on these new items.

Admiral MCCLELLAN. All the items of equipment requested in fiscal year 1973 have been procured in fiscal year 1972 and fiscal year 1971.

A–7A/B AND F–14 AIRCRAFT ENGINE

Chairman ELLENDER. Just what is the requirement of $11.5 million for engineering effort on the engine used in the A–7A/B and F–14A aircraft?

Admiral MCCLELLAN. The $11.5 million requested for engines used in the A–7A/B and F–14A aircraft will be used to cover the engineering design, engine testing, flight testing, engine and rig parts support and project management necessary to resolve problems that have occurred during operational use and testing (flight and rig test). I will be happy to submit a listing of the type of problems that we expect to encounter.

(The information follows:)

(*a*) Low cycle fatigue failures of rotational members.
(*b*) Compressor blade shroud failures.
(*c*) Development of a rebraze technique for compressor stator assemblies.
(*d*) Failure of 9th stage airseal and heatshield assembly.
(*e*) Fuel nozzle coking and leakage.
(*f*) Combustion chamber cracking and smoke-emission reduction.
(*g*) Turbine vane and blade cracking and coating erosion.
(*h*) 1st and 2nd stage turbine air sealing ring failure.
(*i*) Fuel control malfunctions resulting in flame-out.
(*j*) Afterburner spray ring failure.

AV–8A AIRCRAFT ENGINE

Senator YOUNG. What is the requirement for the $5 million requested for work on the F402–RR–401 engine used in the Marines' AV–8A Harrier VTOL aircraft?

Admiral MCCLELLAN. The $5 million has been requested to fund a joint component improvement program with the United Kingdom. The program was negotiated with the understanding that the U.S. Government would fund half of the total program. The program for fiscal year 1973 is forecast to be slightly over $10 million. Typical problems include but are not limited to the following:

(a) Thermal cracking of high pressure 1st stage turbine rotor blades.

(b) Low cycle fatigue of high pressure 2d stage compressor disc.

(c) Hot spot burning of high pressure turbine stator blades.

There are approximately 30 other items currently included in the F402 component improvement program. Continuous effort toward early solution of these problems is necessary during fiscal year 1973 in order to insure continued reliable service from the engines in service and to insure high quality of new production engines.

A–7E AIRCRAFT ENGINE

Chairman ELLENDER. Comment briefly on the work that you anticipate doing with the $4.8 million for work on the TF41–A–2 engine used in the A–7E aircraft.

Admiral MCCLELLAN. The $4.8 million requested for the TF41–A–2 engine will be used to fund development refinements that must be carried out on a continuing basis since it is only through production

and operational use that installation, operational, durability, reliability, maintainability and producibility problems beyond those detected during the development phase can be discovered. I will give some examples of typical problems that will be worked on in the fiscal year 1973 program:

Service engines have been experiencing failure of a high pressure turbine spacer. Starting in October 1971 nine failures have been confirmed and an additional five spacers were found to be cracked on disassembly. Design analysis by the contractor indicates that satisfactory turbine operation can be expected with the turbine spacer removed. An extensive program of rig and engine testing has been initiated to determine the cause of failure and to develop the required corrective action.

High-time combustion liners are evidencing cracking and heat erosion in the transition section and fretting wear on mating surfaces. Development work is required to reduce metal temperatures in areas where cracking is found in order to further extend the service life of this component.

The high-pressure turbine blades initially released to production were forged and machined from Nimonic 108 material. The complexity of this process resulted in a cost which was almost twice that of a cast blade. In an effort to reduce the cost of the blades, a cast version with life considered to be comparable to that of the forged blade was developed and offered for production release. Continued development effort is required to extend life by reduction of metal temperatures and gradients through improved cooling techniques.

The 2nd stage high pressure turbine blade currently in production is considered to be the life limiting component of the turbine in service due to its low calculated creep life. Experience has also shown it to be susceptible to thermal shock cracking at the tip section.

Manual fuel control units in the field have experienced failures in the torque tube which separates the fuel and air sections of the unit. Fuel contamination has resulted in several instances of seizure of the uniball mechanism in the metering valve servo assembly. There are approximately 20 other similar items in the TF41 component improvement program.

Senator YOUNG. With respect to this $58 million requested for component improvement, does this effort result in the actual improvement to a number of these engines, or does it merely result in determining what needs to be done to improve these engines?

Admiral MCCLELLAN. The $58 million requested for component improvement results in determining what needs to be done to improve the engines. The end products of the component improvement program are engineering change proposals that outline the cost and hardware required to make improvement changes to the engines. No retrofit kit hardware is purchased with these funds.

AIRCRAFT INDUSTRIAL FACILITIES

Aircraft industrial facilities ($28.2 million) which finances modernization and maintenance of government-owned production and rework facilities necessary for the efficient production and maintenance of aircraft.

INDUSTRIAL PLANT EQUIPMENT

Chairman ELLENDER. The $28.2 million requested for industrial facilities includes $18.9 million for industrial plant equipment for the Naval Air Rework facilities. Comment on the nature of this equipment, and also on the need for this equipment.

Admiral MCCLELLAN. The $18.9 million will be used to procure general purpose industrial plant and test equipments for the Naval Air Rework facilities and the Naval Avionics facility, Indianapolis. This type of equipment includes such items as metal cutting and forming machines; avionics, hydraulics and pneumatic test equipment; automated machine tools, equipment control devices and storage and retrieval systems; and all other types of equipment necessary to repair, overhaul and maintain aircraft, engines, missiles, avionics systems and aircraft ground support equipment. The equipment is divided into three general categories; namely, initial outfitting equipment for approved military construction projects, replacement of old obsolete equipment, which has become marginal in its capability to meet work tolerances, and latest "state-of-the-art" equipment to modernize industrial operations and meet new process requirements related to the newer, more sophisticated aircraft weapons systems.

Until the initiation of a modernization program for the rework facilities in fiscal year 1969, almost no funding had been provided to modernize our World War II industrial facilities. In effect, the Navy was faced with attempting to rework modern-day sophisticated aircraft weapons systems in seriously outmoded industrial plants. In spite of reductions in numbers of operating aircraft, the flying hours program, and civilian employees at the rework facilities, the Navy cannot now meet the aircraft weapons systems rework work load generated by the fleet. In fiscal year 1973, it is estimated that some 1,000 aircraft will be on extended tours with the fleet which means they will continue to be operated beyond the date where they should be inducted into a rework facility for rework. During this same fiscal year, the fleet engine pool will be short about 1,000 engines required for replacement purposes, and the rework of aircraft system components and parts for issue through the supply system to the fleet for replacement purposes will continue to be below required stock levels. This situation is caused by the fact that the man-hours or norms required to rework today's more complex aircraft weapons systems and components have increased substantially over those required for the older model aircraft. The increase in complexity of necessary work has more than offset those factors tending to decrease work, such as reduced numbers of aircraft and flying hours. This factor coupled with both personnel and funding constraints is the reason the Navy cannot meet fleet generated work load requirements for aircraft weapons systems.

Had it not been for the equipment modernization already accomplished and that proposed for fiscal year 1973 and future years' programs, the norms or cost of rework would now be well beyond a reasonable level, even considering inflation factors, and would become intolerable within a few years. Directly related to this and of equal importance is the necessity of obtaining maximum productivity from those employees still on the pay rolls of the rework facilities, after personnel reductions. Most items of equipments to be purchased will result in benefits that will keep rework costs or norms from "skyrocket-

ing" and enable the attainment of maximum productivity from available employees. Thus if the Navy is to meet minimum aircraft weapons systems rework requirements, let alone those larger requirements actually generated by the fleet, it is absolutely essential that the equipment modernization of rework facilities be continued and that the funds requested in this budget line item be approved.

Calibration Equipment

Senator Young. Just what is involved in the request of $1.5 million for calibration equipment?

Admiral McClellan. The $1.5 million provides for the procurement of measurement equipment which will be used to ensure that test equipment used on Navy aircraft and missile systems is operable and accurate within design parameters. This is a continuing program to insure accurate measurement throughout the Navy. Calibration equipment procured under this program is provided to fleet calibration sites, and calibration and standards laboratories.

Machine Tools and Related Production Equipment

Chairman Ellender. Of the $28.2 million requested for industrial facilities, $1.8 million is for "replacement/restoration of machine tools and other related production equipment." Please comment on this item.

Admiral McClellan. These funds are required to rehabilitate and replace equipment in government-owned contractor operated production lines. The equipment which would be repaired or replaced is highly specialized and peculiar to the aircraft industry. Replacements would be in the nature of high performance multi-axis numerically controlled machines which produce complex aerospace components at reduced costs. Any replacements are made only after the contractor indicates an unwillingness or inability to provide the replacement. Rehabilitation is authorized under existing contract clauses.

Senator Young. Just what will you do with the $3.2 million included in the request for industrial facilities for "capital maintenance, emergency repairs, and fire protection improvements?"

Admiral McClellan. These funds provide for capital maintenance, modernization and improvements to government-owned contractor operated plants which support the aircraft producing industry. Maintenance in the nature of major roof repairs, updating of utility systems and similar major maintenance projects are included for accomplishment. The facilities management contracts under which these plants operate requires that the government approve and fund this type effort.

Chairman Ellender. Please comment on the request of $2.8 million for new production manufacturing and test facilities.

Admiral McClellan. This request for $2.8 million will provide for an industrial sewage treatment plant for the government owned LTV plant at Dallas. At present, this industrial waste is discharged directly into an adjoining lake without treatment. The new plant will be constructed in order to comply with State and Federal statutes regarding pollution. Flow of the treated waste will then go into the Dallas municipal sewage disposal lines. Failure to correct this situation could result in State actions which would effect the defense production at this plant.

WAR CONSUMABLES

War consumables ($0.9 million) provides funds for auxiliary fuel tanks, pylons and ejector racks. These items are of a consumable nature related primarily to the number of sorties flown by combat or training aircraft.

Chairman ELLENDER. The request for aircraft support equipment and facilities includes $0.9 million for "War Consumables'" Just what is involved in this request?

Admiral MCCLELLAN. This is a new line item in the budget. It provides for procurement of bomb racks, auxiliary fuel tanks, and similar equipments. These items were formerly budgeted under the aircraft procurement programs, but were transferred to budget activity 7 to effect comparability with Army and Air Force budget submissions, and also because the equipment being procured is not related to the quantity of aircraft procured but to the number of fleet sorties.

OTHER PRODUCTION CHARGES

Other production charges—$25.4 million—which provides funds for certain production support and testing services, aircraft cameras, various equipment for Coast Guard aircraft and ground support equipment for aircraft not in production.

Chairman ELLENDER. This is for equipment only?

Admiral WEISNER. Support equipment and facilities.

Chairman ELLENDER. It does not relate to the purchase of gasoline or POL?

Admiral MCCLELLAN. No, sir.

OTHER PRODUCTION CHARGES

Chairman ELLENDER. Of the total, $9.2 million is for Government furnished equipment support. Just what is involved in this request?

Admiral MCCLELLAN. Funds are requested under GFE production support for requirements which cannot be charged to a specific aircraft in the current procurement program or where difficulty in administering funds would make it impractical to do so. The funds are required for five separate categories of support. I will supply further details for the record.

(The information follows:)

The $9.3 million requested for Government furnished equipment (GFE) production support is related to the following areas of effort:

1. Preproduction, initial production and qualification testing of GFE avionic, armament, and safety equipment. These quality assurance tests are required to determine if equipments are being produced in full accordance with specifications. Tests are performed by commercial testing laboratories, at selected field activities, or at supplier facilities under surveillance of specialists from these activities, $6 million.

2. Review of production data to permit work simplification and to assure that design data furnished by a contractor is adequate to permit competitive procurement, $0.8 million.

3. Technical publications required as part of an initial outfitting but which cannot be identified to an individual aircraft because they relate to GFE items which are applicable to various aircraft, $1.1 million.

4. Repair of GFE which is damaged or defective when received by the prime contractor, and procurement of Navy stock fund items associated with technical directives. Certain fuels and lubes are also funded by the program, $0.8 million.

The remaining $500 thousand of the budget is required to support miscellaneous

items such as the NAVAIR share of royalty payments resulting from license agreements related to certain Navy procurements.

Senator YOUNG. Just what do you expect to do with the $800,000 requested under other production charges for the installation of equipment in Coast Guard aircraft?

Admiral MCCLELLAN. The $800,000 requested is for the procurement of avionics equipment for installation in Coast Guard aircraft. This is in accordance with an agreement between the Navy and the Coast Guard on interservice logistic support.

Chairman ELLENDER. Of the total requested for Other Production Charges, $3.2 million is for reconnaissance and other aerial cameras. How much was required for the procurement of this type equipment in fiscal years 1971 and 1972?

Admiral MCCLELLAN. I will be glad to provide this information.

(The information folllows:)

	Fiscal year 1971	Fiscal year 1972
Cameras:		
Aerial (Rewson)	2.7	3.0
Other	.5	.5
Total	3.2	3.5

CH–46 SUPPORT EQUIPMENT

Chairman ELLENDER. Please comment on the $3.1 million requested for CH–46 support equipment.

Admiral MCCLELLAN. The funds requested in fiscal year 1973 will provide for procurement of organizational level support equipment to support the additional helicopter detachments when they are deployed aboard ship. In order to enhance deployment capabilities, nine Marine medium helicopter squadrons, 21 helicopters each, along with other helicopter assets are being split into 18 detachments of 12 helicopters each. These detachments will be deployed on amphibious assault ships (LPH and LHA). There is no increase in intermediate or depot level support equipment as the result of splitting the squadrons.

RH–53/TA–4J AIRCRAFT SUPPORT EQUIPMENT

Chairman ELLENDER. On page 67 of the justifications, I note a request of $5 million for RH–53 and TA–4J support equipment and services for aircraft in the fiscal year 1972 procurement plan but not yet delivered to the Navy. Exactly what is involved in this request?

Admiral MCCLELLAN. I would like to furnish that information for the record.

(The information follows:)

The $1.3 million PAMN funds for the RH–53D in fiscal year 1973 are for:

	In millions
Airframe PGSE deferred from fiscal year 1971	$0.270
Avionics PGSE deferred from fiscal year 1971	0.230
Two sets of MMF (Mobile maintenance facility) vans for support of airborne mine countermeasures detachments	0.500
Contractor technical services requirements (9 man-years at $33K for the period from Oct. 1, 1972 through Sept. 30, 1973)	0.300
Total RH–53D	1.300

The $3.7 million PAMN funds requested for the TA–4 in fiscal year 1973 are for:

	In millions
Airframe PGSE for AIMS	$0.115
Engine PGSE systems and sonic	0.191
Avionics PGSE engine analyzer	0.111
NAMT/WST changes and GFE	1.880
Publications and revisions	0.375
Factory training and training parts	0.190
Contractor technical services	0.838
Total TA–4J	3.700

FIRST DESTINATION TRANSPORTATION

Senator YOUNG. The total of $25.4 million requested for other production charges includes $4.1 million for first destination transportation charges for aircraft, missiles, and related equipment procured under this appropriation, except ballistic missiles. How much was required for first destination transportation for these items in fiscal years 1971 and 1972?

Admiral MCCLELLAN. In fiscal year 1971 and fiscal year 1972 we budgeted $4.3 million and $4.9 million respectively for first destination transportation requirements.

Chairman ELLENDER. Proceed.

AIRCRAFT PROCUREMENT BUDGET REQUEST

Admiral WEISNER. Our total aircraft procurement request is for 282 aircraft and $3,101.6 million.

MISSILE PROGRAMS

Mr. Chairman, I will now review the missile procurement request.

This program has the last five of the 12 PAMN budget activities and provides funds for:

Fleet ballistic missiles; Navy and Marine air-to-air missiles; Navy and Marine air-to-surface missiles; ship launched surface-to-air missiles; aerial targets, and related missile modification, spare parts, and industrial facilities support.

As in the aircraft programs, the data slide will show the weapons system cost and the related initial spares request.

POSEIDON MISSILE

Chairman ELLENDER. Admiral, before you proceed with your discussion of the request for the Poseidon missile, I want to include the Poseidon missile data sheet in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—MISSILE DATA SHEET

Service: Navy.—Nomenclature: Poseidon fleet ballistic missile system (UGM–73A) P–1 line item Nos. 67, 68, 94, and 95; popular name Poseidon missile.

Mission/Description.—To develop and deploy a flexible sea-based Fleet Ballistic Missile Weapon System to provide a highly invulnerable offensive weapon as a primary deterrent to enemy initiation of surprise nuclear attack, capable of inevitable retaliation against specified targets. Poseidon is a two-stage solid propellant missile with improved accuracy, larger payload than Polaris and with multiple independently targetable re-entry vehicles. The Poseidon Missile System replaces the Polaris Missile System on 31 of 41 SSBN's.

COST DATA

[In millions]

	Fiscal year								Cost to complete [2]	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976 [2]	1977 [2]		
Missile procurement:										
Quantity		[Deleted]								[Deleted.]
Cost	$941.1	$485.8	$312.7	$305.4						2,397.5
Less advance procurement	0	0		−17.7						−67.3
Net current year program	941.1	485.8	312.7	287.7						2,330.2
Plus advance procurement	0	0	+32.5	+34.8						+67.3
Missile procurement unit cost	4.753	3.421	2.792	3.215						[Deleted.]
Weapons system cost	941.1	485.8	345.2	322.5			[Deleted] [1]			2,397.5
Initial spares	23.4	6.4	4.9	2.8						40.0
R.D.T. & E.N	918.7	44.9	7.6	0						971.2
Milcon	25.3	0	0	0						25.3
Program acquisition cost	1,908.5	537.1	357.7	325.3						3,434.0
Program unit cost										[Deleted.]
Total additional cost [3]			.9	.8						3.7

[1] [Deleted.]

[2] Replenishment spares and missile industrial facilities. The missile industrial facilities amounts (P-1 line item No. 95) are included in SAR adquisition portion as follows: Fiscal year 1972, .8, fiscal year 1973, .7; [deleted].

[3] Acquisition considered complete in [deleted] costs thereafter are not included on this exhibit nor in SAR.

Basis for FY 1973 Request: The request continues the procurement of the POSEIDON missile based on the scheduled SSBN conversion rate. The FY 1973 procurement provided for outloading the twenty-fourth SSBN to be converted to POSEIDON capability. In addition, there is funding for advance procurement, missile procurement support, DOD components and operational support.

TEST DATA

Development	Military tests (SSBN firings)	Demonstration and shakedown operations (DASO)
Commenced Aug. 16, 1968. Completed June 29, 1970. Firings—20. Successes—14.	Production Evaluation Missiles (PEM): Commenced Aug. 3, 1970. Completed Oct. 6, 1970. Firings [deleted]. Weapon system success ratio [deleted].[1]	Commenced Oct. 23, 1970. Completed—openend. Firings (through December 1971) [deleted]. Weapon system success ratio [deleted].

[1] The weapon system success ratio is determined by multiplying the launch success ratio by the inflight success ratios.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Missile system and rocket motor	Lockheed Missiles & Space Co., Sunnyvale, Calif	CPIF
Warhead	Atomic Energy Commission	
	Lockheed Missiles & Space Co., Sunnyvale, Calif	CPIF
Guidance	General Electric Co. Ordnance Systems, Pittsfield, Mass	CPFF
	Raytheon Co., Lexington, Mass	CPFF

LAUNCHER

[Hughes Aircraft Corp., Culver City, Calif., CPFF. Westinghouse Electric Corp., Sunnyvale, Calif., CPFF]

	Class	Development estimate	Demonstrated
Performance:			
Maximum range, full payload (NM)[1]	C		
System CEP, MK 3 guidance (NM)[1 2]	C	[Deleted]	
System reliability[1]	S		
Characteristics—Poseidon C-3:			
Length (ft.)	U	34.13	----------
Diamter (ft.)	U	6.17	----------
Gross Wt. (lbs.)	C	[Deleted]	----------
Motor Stages (solid)	U	2	----------
Warhead	U	W-68	----------

[1] Target; not a requirement.
[2] CEP for inertial system for [Deleted].

REQUIREMENTS—PRODUCTION DATA—LOSSES AND ASSETS

Inventory objectives/requirements	End fiscal year 1971 FDP	End fiscal year 1972 FDP	End fiscal year 1973 FDP
Forces units (SSBN)[1]	14	20	24
Missiles	[Deleted]		

[1] 16 Launchers per SSBN.

COST HISTORY COMPARISON

	Quantity		Dollars (millions)
Initial planning estimate:			
Procurement	[Deleted]		2,243.4
R.D.T. & E.		30	933.0
Milcon			37.0
Total program costs	[Deleted]		3,223.4
Current estimate total acquisition program (fiscal year 1972 budget submission):			
Procurement	[Deleted]		2700.9
R.D.T. & E.N.		21	973.8
Milcon			25.3
Total program costs	[Deleted]		3,700.0
Current estimate total acquisition program (fiscal year 1973 budget submission):			
Procurement	[Deleted]		2,437.5
R.D.T. & E.N.		21	971.2
Milcon			25.3
Total program costs	[Deleted]		3,434.0

Note. The reduction in procurement costs reflects the repricing of missile and other equipment costs.

Admiral WEISNER. To maintain the continued effectiveness of the fleet ballistic missile system against postulated enemy defensive capabilities through the 1970's, development of the Poseidon (C–3) missile was begun in fiscal year 1966.

Poseidon employs technology developed as a result of operational testing and service use of the highly reliable Polaris missile. The principal advantage of Poseidon is its adaptability to overcome a broad spectrum of defenses.

The multiple independently targetable reentry vehicle (MIRV) will insure continued effectiveness of the FBM system against Soviet antiballistic-missile systems.

PLANNED PROGRAM

The fiscal year 1973 request to procure [deleted] Poseidon missiles represents the fifth of six planned procurements. A total of 452 missiles have been previously approved toward a December 1976 inventory requirement of 639 missiles.

POSEIDON FUNDING

Chairman ELLENDER. Let me be sure that I understand your request for the Poseidon missile. You are requesting [deleted] Poseidon missiles at a cost of $305.4 million which is offset by advance procurement of $17.7 million provided in prior fiscal years for a net requirement of $287.7 million for these [deleted] missiles. In addition, you are requesting $34.8 million for advance procurement to support the production of Poseidon missiles in fiscal year 1974, for a total request of $322.5 million exclusive of $2.8 million for initial spares. Have I stated this request correctly?

Admiral WEISNER. Yes, sir. The advance procurement of $17.7 million from fiscal year 1972 supports the fiscal year 1973 missile procurement. The remaining portion of the fiscal year 1972 advance procurement supports the fiscal year 1974 missile procurement, as does the $34.8 million of fiscal year 1973 advance procurement.

ADVANCE PROCUREMENT

Chairman ELLENDER. There was a recent reprograming involving $32.5 million for advance procurement for the planned fiscal years 1973

and 1974 Poseidon procurement program. Is this the $32.5 million advance procurement entry in the fiscal year 1972 column of the missile data sheet.

Admiral WEISNER. Yes, sir.

PROCUREMENT COST INCREASE

Senator YOUNG. On the missile data sheet, I note that the missile procurement unit cost for the fiscal year 1972 program was approximately [deleted] and that your request for fiscal year 1973 is based on a missile procurement unit cost of approximately [deleted]. Just what accounts for this increase in the procurement cost of the missile?

Admiral WEISNER. The unit costs you see before you are based on the total costs for Poseidon which include, in addition to the missile itself, funding for production support, DOD components and engineering services. These costs are not directly related to the number of missiles proposed for procurement and thereby tend to distort the average unit costs. The increase in unit cost shown on the missile data sheet is a result of adding these other costs to that of the missile. More specifically, production support has increased from fiscal year 1972 to fiscal year 1973 for the procurement of alteration kits and replenishment of components used in missile production. Funding for DOD components has also increased due to the need to procure a higher number of shells to meet the Atomic Energy Commission's warhead production schedule. Engineering services, on the other hand, has been reduced in fiscal year 1973. The combination of these items when added to the actual missile unit cost yield the values on the missile data sheet. It should be noted that the missile procurement unit cost on a total program basis is shown as [deleted] in this year's data sheet as compared to [deleted] reflected in last year's data sheets. The actual unit cost for an equivalent tactical Poseidon missile in both years is approximately [deleted].

INITIAL SPARES

Chairman ELLENDER. I assume that the $2.8 million requested for Poseidon initial spares is included in the total request for missile spares and repair parts. Is this correct?

Admiral WEISNER. Yes, sir.

1973 ADVANCE PROCUREMENT

Chairman ELLENDER. Please comment on the need for the $34.8 million advance procurement that you are requesting for fiscal year 1973.

Admiral WEISNER. Yes, sir. This request for Poseidon advance procurement recognizes certain production problems with components provided by both weapon system contractors and the Atomic Energy Commission. This has necessitated advance procurement of $10.3 million for type 2F head test instrumentation; $8 million for assembly of arming and fuzing system components advance procured in fiscal year 1972; and $16.5 million for missile subassembly components. Certain production sources are not expected to be available for orders placed after fiscal year 1972 for some items and fiscal year 1973 for others. In other cases the small annual quantities expected to be placed on order in future years is not acceptable to existing vendors, nor would

be sufficient to maintain continuous production lines at a level required for consistent quality or reliability. All the selected components are budgeted to support an ultimate missile population of [deleted] which will enable annual testing programs to be continued.

MISSILE REQUIREMENT

Chairman ELLENDER. I note on the missile data sheet that your current stated total requirement for Poseidon missile is [deleted]. The 31 submarines that you intend to convert to the Poseidon configuration will require only 496 of these missiles. What is the requirement for the remaining [deleted]?

Admiral WEISNER. In addition to shipfill missiles the total quantity includes an operational support pipeline to allow for missiles to be returned for inspection and repair; consumption of missiles during demonstration and shakedown operations that are scheduled after each conversion and overhaul, and operational tests conducted by the Fleet each year. The total quantity is expected to meet requirements [deleted] in accordance with currently approved testing schedules.

POLARIS MISSILES

Chairman ELLENDER. If there are no further questions, we will proceed with the consideration of the request of $13.7 million for the support of Polaris missiles. The statement appearing on pages 68 and 69 of the justifications pertaining to this request will be included in the record at this point.

(The information follows:)

POLARIS

Although Polaris missiles are no longer being procured, missile tests will continue throughout their operational life. Missiles are fired as part of the demonstration and shakedown (DASCO) exercise after SSBN overhauls, and operational tests evaluate the readiness of deployed missiles in accordance with Joint Chiefs of Staff test criteria. The fiscal year 1973 budget provides $2.5 million for recurring Polaris missile costs. These include instrumentation components for tests; replacement of FBM-peculiar special purpose tooling and test equipment to support Polaris operations at the Polaris Missile Facilities (POMFLANT and POMFPAC); system integration; calibration services; first destination transportation based on shipping costs from contractors' plants; and missile alterations and special purpose hardware.

$11.2 million is requested in fiscal year 1973 for Polaris operational support. Although all A–2 and most A–3 missiles presently deployed will eventually be replaced by Poseidon, they currently represent an indispensable element of our national deterrent posture. Preservation of the reliability of the Polaris-configured FBM system will remain a matter of strategic urgency.

Polaris operational support consists of the identification of problem areas caused by design, operating conditions, and maintenance defiencies; data analysis and evaluation of DASO/OT/FOT flight tests; the collection and maintenance of data from reporting activities on missile system and component performance; the maintenance of operational documentation; the determination of missile system and component problems; system integration and project management; design documentation; configuration control; and safety analysis and reliability programs. These efforts apply in varying degrees to missile motors and flight components, the arming and fuzing device, and guidance system components.

Admiral WEISNER. Although these missiles are no longer procured, continued operational tests and support are required. All but 10 of the 41 fleet-ballistic-missile submarines will ultimately carry Poseidon; however, the Polaris-configured FBM system continues to represent an indispensable element of our national deterrent posture.

PREVIOUS PROCUREMENT

Chairman ELLENDER. When was the last year we funded the procurement of Polaris missiles?

Admiral WEISNER. The last procurement of Polaris A–3 missiles was funded in fiscal year 1966. No additional missile procurement is planned for Polaris as sufficient quantities of tactical missiles being off-loaded from SSBN's as they enter overhaul or Poseidon conversion will be available to meet future testing requirements. Procurement of special test instrumentation components will be required on an annual basis to support these future testing requirements.

Senator YOUNG. Just how long will you continue to ask for funds in the procurement appropriation for the support of the Polaris missiles?

Admiral WEISNER. Funding will be required for Polaris as long as the system is actively deployed. These funds will provide for recurring missile costs associated with planned testing requirements and the minimum operational support funding necessary to preserve the reliability of the Polaris-configured system as an indispensable part of our national deterrent posture.

Chairman ELLENDER. Proceed.

Admiral WEISNER. Funds are requested to support planning for shore base missile support facilities for this new sea-based strategic system.

ULMS MISSILE

Chairman ELLENDER. Exactly what do you plan to do with this $10 million you are requesting for the ULMS missile?

Admiral WEISNER. If I may, I will provide for the record a description of the work to be accomplished with the $10 million.

(The information follows:)

Facility Planning.—Includes assembly of data and projection of requirements based on conceptual definition of missile size, fleet size, rate of missile requirements, and operational data to provide a missile facility which is capable of meeting fleet operational programs. The following major elements of facility planning, which are interdependent, require early definition through trade-off studies to provide for an orderly facility activation:

Facility Requirements Plan.—This plan, which defines the agreed to mode of operation for the facility, presents concepts which include siting information, proposed new and modified structures sequence and time estimates based on actual times from the newest weapons and estimates of the state-of-the-art at the time of deployment, projected processing schedules and capability requirements necessary to design a facility which will meet the desired IOC and support the projected missile program.

Facility Activation Plan.—This plan defines and establishes the requirements and responsibilities of the Government, the contractors, and subcontractors for the total activation of the facility. It also establishes the milestones for each element required for activating the facility such as site preparation, building design, military construction, equipment installation, personnel training, manning, equipment proofing, slow-run-throughs and missile processing.

Facility Master Equipment List.—This list includes all equipment based on data being developed under the Facilities Requirements Plan required to operate a facility and specifies manufacturing leadtimes and delivery dates which must be met in order to allow for installation in accordance with activation milestones.

Determination within a selected site, locations for the various facilities and functional areas required at a missile facility; such as assembly facilities, component testing facilities, explosive storage areas, nuclear security storage areas, missile outloading wharf location, missile haul road and railroad networks.

Safety Requirements Studies.—These studies marry the particular safety requirements dictated by the various components in the missile to a specific site which is under study or which has been selected to determine minimum explosive safety distances which are required between explosive operating buildings and storage areas and between these functional areas and other inhabited buildings. These studies provide information leading to land utilization, land acquisition and/or easement requirements.

Initial Facility Design.—Facility sizing refers to making a determination as to the number of specific buildings and magazines required to meet the operational needs. This sizing is derived from an analysis of the processing rate and an estimate of the time required to perform missile assembly and checkout operations.

Initial facility design coverts the basic Facility Requirements Plan into the specific design parameters necessary to fit the plan to the designated site. Such items as utility provision plans, bridge crane capacities and hook heights, door opening sizes, special materials, environmental control requirements, service connections such as electrical, nitrogen, air, etc., and special equipment needs are sufficiently described and provided to an Architectural and Engineering Firm (A&E) to enable the preparation of detailed architectural and engineering drawings and construction specifications.

Admiral WEISNER. In summary, of the $346.2 million requested for ballistic missiles, $322.5 million is for Poseidon; $13.7 million is for Polaris; and $10 million for ULMS.

PROGRAM ACCELERATION

Chairman ELLENDER. There is some question whether ULMS should be produced as rapidly as the Navy intends it to be. I presume your request here is on the assumption that we are going into a crash program for this system. Am I right?

Admiral WEISNER. On the basis that we are going with the ULMS; yes, sir. I would hesitate to define the nature of it specifically as a crash program. It is on the order of an initial funding to get the program started.

Mr. KAHN. Mr. Chairman, this is a portion of the $945 million that was discussed before your committee yesterday.

Chairman ELLENDER. I had asked yesterday, if you recall, for total amount requested for ULMS development.

Mr. KAHN. Yes, sir; $10 million of that total is in the PAMN account in 1973.

FUNDING PREMATURITY

Chairman ELLENDER. This is a program that actually is still in its early stages. I want to help protect you from going ahead so precipitiously that mistakes may be made which will require costly retrofitting. Generally, for what will this $10 million be utilized?

Mr. KAHN. Mr. Chairman, the $10 million requested in PAMN is to support planning for the design and layout of the explosive weapons area for refitting.

Chairman ELLENDER. Until you have the submarine in being, you won't need these missiles.

Mr. KAHN. Yes, sir.

Chairman ELLENDER. In a program involving billions of dollars ul-

timately, and with the procurement of the Poseidon program only now nearing completion, the need for urgency is open to question.

AUTHORIZATION SUPPLEMENTAL REQUEST

You will recall that the Senate Armed Services Committee refused to go along with your recent supplemental request.

Mr. KAHN. I believe the authorization committee is reconsidering the ULMS portion of the supplemental request.

Chairman ELLENDER. Where did you get that information?

Mr. KAHN. Informally, sir.

Chairman ELLENDER. I shall look into that.

ULMS SCHEDULE

If a decision were made to proceed with the schedule set out in the Packard decision of September 1971 for the development of the ULMS program, would this $10 million still be required?

Admiral WEISNER. That decision established an IOC for the ULMS I missile which is to be compatible with the Poseidon configured submarines. The decision spoke of maintaining the option of deploying a new ULMS submarine force in the early 1980's; but did not establish an IOC for this new force. Under that decision, Mr. Chairman, the $10 million would not be required as it is associated with the refit facility required to support the new submarine force.

Chairman ELLENDER. If a decision were made to continue the ULMS development schedule in accordance with the schedule submitted in support of the budget for fiscal year 1972, would this $10 million be required in fiscal year 1973?

Admiral WEISNER. The development schedule supporting the fiscal year 1972 budget would have led to a [deleted] IOC. Under that schedule, sir, PAMN funds would not be required in fiscal year 1973.

SPARROW III

Chairman ELLENDER. The next item is the request of $83.1 million for the Sparrow air-to-air missile, of which $77 million is for the initial procurement of (deleted) Sparrow AIM–7F missiles, and $6.1 million to support AIM–7E missiles in the inventory. The missile data sheet will be included at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE—MISSILE DATA SHEET

Service: Navy.—Nomenclature: AIM–7E/F, P–1 Line Item: *70;* Popular Name: *Sparrow.*

Description/Mission.—The SPARROW is a semi-active radar guided air-to-air/ship-to-air missile using continuous wave guidance for target tracking and interception. It provides an all-weather, all-aspect capability with a high single shot kill probability against high performance aircraft at altitudes from sea level to [deleted] feet in a variety of electronic countermeasure environments. The missile is currently employed by Navy and Air Force F–4 aircraft and Navy shipboard Point Defense Surface Missile System. SPARROW will also be utilized by F–14 and F–15 aircraft. The AIM–7F replaces and provides significant improvements over previous models due to greater range, improved electronic counter-countermeasures capability, larger warhead, "snap start" (more quickly ready to fire), reduced field test requirements and improved reliability.

COST DATA

[Dollars in millions]

	Fiscal year								Cost to complete	Current estimated total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity[1]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]
Cost	264.4	23.4	40.0	83.1	66.6	61.9	56.3	57.5	505.3	1,158.5
Procurement unit cost	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]
Weapon system cost	264.4	23.4	40.0	83.1	66.6	61.9	56.3	57.5	505.3	1,158.4
Initial spares	2.3	.9	.2	.8	.7	.7	.6	.8	4.1	11.1
R.D.T. & E	52.4	2.3	21.4	9.7	2.6	1.4				89.8
Milcon										
Program acquisition cost	319.1	26.6	61.6	93.6	69.9	64.0	56.9	58.3	509.4	1,259.4
Program unit cost										[deleted]
Total additional cost	24.6	4.7	1.4	1.1	3.8	4.2	4.5	4.6	31.0	79.9

[1] Includes 78 R.D.T. & E. missiles funded in fiscal year 1970 and prior and 50 in fiscal year 1972.

Basis of FY 1973 Request.—The $83.1 million request provides for procurement of [deleted] AIM–7F missiles at a cost of $77.0 million and $6.1 million to support AIM–7E missiles already in the Fleet. The [deleted] AIM–7F missiles are required to partially offset projected SPARROW expenditures during the delivery period and minimize inventory drawdown. The inventory at the end of the FY 1973 funded delivery period will be [deleted] percent of objective.

Test Data:

AIM–7E—all testing is completed.

AIM–7F:

(a) Naval Technical Evaluation (NTE).

Beginning August 1969 and ending January 1972:

Number of test firings	[Deleted.]
Successes	[Deleted.]
Failures	[Deleted.]
No tests	[Deleted.]

Of the [deleted] failures, [deleted] were associated with design and [deleted] were attributed to component failures. Of the [deleted] design failures, [deleted] were related to power supply problems [deleted] to a faulty initial correction command at high altitude, and [deleted]. The [deleted] component failures were a result of [deleted]. Since March 1971, there have been [deleted] successes, [deleted] no tests and [deleted] failures.

(b) Operational Evaluation (OPEVAL).

Begin/end January 1972/December 1972.

OPEVAL firings will commence in February 1972.

CONTRACT DATA

Major subsystem	Contractors	Type of last contract
Missile system	Raytheon Co	7E—firm fixed price, 7F—fixed price-incentive.
Rocket motor:		
7E	North American Rockewll, Rocketdyne Division.	Subcontract.
7E/F	Aerojet-General Corp	Do.
7F	Hercules Power Co	Do.

Characteristics	AIM–7E	AIM–7F
Guidance	Semi-active with continuous wave radar	Semi-active with pulse doppler or continuous wave radar.
Launch weight	432 lbs	507 lbs.
Warhead weight	70.6 lbs	90 lbs.
Length/diameter/span	144/8/40 inches	144/8/40 inches.
Propulsion impulse	23,000 lbs./second	31,000 lbs./second.

[Deleted.]

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
AIM-7E:		
Procurement	[Deleted]	$718.6
R.D.T. & E	44	22.1
Milcon		
Total AIM-7E	[Deleted]	740.7
AIM-7F:		
Procurement	[Deleted]	428.7
R.D.T. & E	34	24.9
Milcon		
Total AIM-7F	[Deleted]	453.6
Current estimate total program (fiscal year 1972 budget submission):		
AIM-7E:		
Procurement	[Deleted]	318.3
R.D.T. & E	44	18.5
Milcon		
Total AIM-7E	[Deleted]	336.8
IM-7F:		
Procurement	[Deleted]	966.6
R.D.T. & E	34	48.0
Milcon		
Total AIM-7F	[Deleted]	1,014.6
Total AIM-7E/F	[Deleted]	1,351.
Current estimate total program (fiscal year 1973 budget submission):		
AIM-7E:		
Procurement	[Deleted]	313.4
R.D.T. & E	44	18.5
Milcon		
Total AIM-7E	[Deleted]	331.9
AIM-7F:		
Procurement	[Deleted]	856.2
R.D.T. & E	84	71.3
Milcon		
Total AIM-7F	[Deleted]	927.5
Total AIM-7E/F	[Deleted]	1,259.4

Difference between FY 1972 and FY 1973 submissions:

The increased AIM–7E quantities are a result of delays in initiating the AIM–7F program. However the increased costs of this quantity increase have been more than offset by reduced missile support requirements in fiscal year 1973 thru 1977.

The AIM–7F quantity increase is the result of procuring 50 additional RDT&E missiles in FY 1972 for additional testing, design simplification and cost reduction programs. The anticipated results of this program are evident in the reduced cost of AIM–7F production missiles in FY 1973 as compared with FY 1972.

COST DATA—

[In millions of dollars]

	Fiscal year—								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
AIM-TE:										
Missile procurement:										
Quantity		[Deleted]								[Deleted]
Cost	229.1	23.4	40.0	6.1	3.5	2.8	2.6	2.8		310.3
Procurement unit cost		[Deleted]								[Deleted]
Weapon system cost	229.1	23.4	40.0	6.1	3.5	2.8	2.6	2.8		310.3
Initial spares	1.6	.9	.2		.1	.1	.1	.1		3.1
R.D.T. & E	18.5									18.5
Milcon										
Program acquisition cost	249.2	24.3	40.2	6.1	3.6	2.9	2.7	2.9		331.9
Program unit cost										[Deleted]
Total additional cost	24.6	4.7	1.4	1.1	1.0					32.8
AIM-7F:										
Missile quantity										[Deleted]
Procurement cost	35.3			77.0	63.1	59.1	53.7	54.7	505.3	848.2
Procurement unit cost					[Deleted]					
Weapon system cost	35.3			77.0	63.1	59.1	53.7	54.7	505.3	848.2
Initial spares	.7			.8	.6	.6	.5	.7	4.1	8.0
R.D.T. & E	33.9	2.3	21.4	9.7	2.6	1.4				71.3
Milcon										
Program acquisition cost	69.9	2.3	21.4	87.5	66.3	61.1	54.2	55.4	509.4	927.5
Program unit cost										[Deleted]
Total additional cost					2.8	4.2	4.5	4.6	31.0	47.1

Admiral WEISNER. Sparrow is an all-weather, all-aspect, semi-active radar air-to-air missile employed by the Navy and the Air Force on the F–4, and to be employed on F–14 and F–15 aircraft. It is also used as a point defense missile in surface combatants in the Basic Point Defense and NATO-Seasparrow Surface Missile Systems.

AIM–7F VERSION

The AIM–7F will provide significant improvement over the AIM–7E and AIM–7E2 by improved reliability, increased range, improved electronic counter-countermeasures, a larger warhead, and compatability with the pulse doppler radars and higher carriage and launch speeds of the F–14 and F–15 aircraft.

1972 REPROGRAMING OF PROCUREMENT FUNDS FOR CONTINUED DEVELOPMENT AND TESTING

Last year, the AIM–7F missile was not ready for production. The Navy, with Air Force and OSD concurrence, chose to retain the AIM–7 in R. & D. another year and defer initial production.

In response to our request, Congress approved the transfer of $21.3 million from procurement in order to continue development and testing. The results have been most gratifying and I am now confident that the AIM–7F is ready for production.

The problems encountered in the initial R. & D. tests were traced to [deleted] and were corrected by [deleted.] [Deleted.] Tests conducted on the redesigned missiles since April 1971 have resulted in [deleted] successes. [Deleted] failures and [deleted] "no tests."

[Deleted.]

In the successful shots, we have demonstrated high altitude performances to [deleted] feet, head-on capability with a closing velocity of Mach [deleted] maximum ranges out to [deleted] nautical miles, and satisfactory guidance in both continuous wave and pulse doppler radar modes.

The AIM–7F is now meeting development milestones and is ready to enter production. Operational Evaluation (OPEVAL) commenced in January 1972.

AIM–7F CAPABILITIES

Senator YOUNG. Could you be a little more specific with respect to the improved capabilities that the AIM–7F version of the Sparrow missile will have over earlier versions.

Admiral MCCLELLAN. I will be glad to provide that for the record.

(The information follows:)

The improved capabilities that the AIM–7F version of the Sparrow missile will have over earlier versions are:

a. Increased reliability; a requirement for [deleted] reliability achieved through the all-solid-state fabrication and using the snap-start mode of operation;

b. Increased maneuvering capability; the ability to make a [deleted] feet of altitude and to be able to cope with a [deleted] foot altitude differential between launch aircraft and target;

c. Increased maximum firing range on the tail; [deleted] nautical miles at low altitude versus [deleted] nautical miles for the AIM–7E–2;

d. Increased maximum firing range head on of [deleted] nautical miles at high altitude versus [deleted] miles for the AIM–7E–2;
e. Decreased minimum firing range on the tail of [deleted] feet versus [deleted] feet on the AIM–7E–2;
f. Increased opening velocity capability;
g. Improved multiple target capability;
h. Improved electronics countermeasure features;
i. Improved fuzing not susceptible to jet engine modulation effects;
j. Improved kill probability because of a larger warhead and increased lethality radius.

To date, our flight tests indicate that the AIM–7F is roughly [deleted] as effective as the AIM–7E–2 in all performance parameters.

AIM–7F Speed

Chairman Ellender. Earlier in commenting on the continuation of the AIM–7F version of the R. & D. program for an additional year, you stated, "The results have been most gratifying, and I am now confident that the AIM–7F is ready for production." Now, I want to call your attention to the performance data on page 3 of the missile data sheet with respect to the Sparrow AIM–7F. It is indicated that the requirement for maximum speed at a launch of Mach 2.5 is Mach [deleted] then the tests have demonstrated a maximum speed of [deleted] at a Mach [deleted] launch. Do you consider this demonstrated speed at a slower launch speed equal to the requirement for a maximum speed of Mach [deleted] at a launch speed of Mach 2.5?

Admiral McClellan. The highest altitude demonstrated has been [deleted] Mach. This is a missile motor speed increase of [deleted] Mach above the F–4 launch speed of [deleted]. We anticipate the missile will attain [deleted] Mach when higher speed launching platforms are available.

AIM–7F Range

Senator Young. With respect to range, the requirement calls for a maximum of [deleted] nautical miles and a minimum of [deleted] feet, and it is indicated that to date you have demonstrated [deleted] nautical miles and a minimum of [deleted] feet. Do you consider this demonstrated result to have met the stated requirement?

Admiral McClellan. We have demonstrated a range of [deleted] nautical miles with an F–4J AWG–10 missile control system that has a CW illuminator power of [deleted] watts. This equates to a range of [deleted] nautical miles with a [deleted] watt pulse doppler illuminator. Minimum range is a function of the safety and arming device. Extrapolation of telemetry data indicates that this minimum range will be met.

AIM–7F Altitude

Chairman Ellender. The stated requirement is for a maximum launch altitude of [deleted] feet, and a minimum launch altitude of [deleted] feet, and it is indicated that you have demonstrated a maximum of [deleted] feet and a minimum of [deleted] feet. Do you consider this demonstrated performance equal to the stated requirement?

Admiral McClellan. The highest altitude demonstrated has been

[deleted] feet and has been limited by the maximum altitude capability of the target—not the missile. Based upon missile performance and computer extrapolation, we estimate the missile will meet performance requirements. Extrapolation of performance data indicates that the low altitude requirement will also be met.

AIM–7F Reliability

Senator Young. With respect to reliability, the requirement is [deleted] which you indicate has not been demonstrated, and for kill probability, the requirement is [deleted] which you indicate has not been demonstrated. Wasn't this question of reliability one of the major reasons that we delayed going into production on this missile in fiscal years 1971 and 1972?

Admiral McClellan. Yes, reliability was one of the problems identified last year, mainly due to the complexity of some portions of the missile. Our efforts in the past year have been directed toward simplification of the missile through elimination of hybrid circuits and switch cards, and replacement of the low voltage power supply. The reliability evaluation of the simplified missiles has not been completed.

The Naval Missile Center has flown the production configuration of the AIM–7F missile over [deleted] captive flights with [deleted] failures for an indicated reliability of [deleted] percent. The captive flight portion of the operational evaluation commenced in January 1972 and in the first 2 months the [deleted] missiles in the sample have had [deleted] catapult launches and arrested landings, [deleted] captive flight hours, and [deleted] tuning cycles without a failure. The program is continuing and each missile has approximately [deleted] captive flight hours to date and still no failure. We are confident that the reliability criteria will be met.

Kill probability figures are predictions based on lethality analysis against projected threat aircraft. Kill effectiveness will be assessed in a few live warhead firings during the operational evaluation. Kill probability is not normally demonstrated during development due to the high cost of missiles and real aircraft targets. Based upon the performance to date, we believe the missile will attain the predicted kill probability.

1973 Program and Funding

This year's request represents the first full production of the AIM–7F. [Deleted] missiles are required to partially offset projected Sparrow expenditures and minimize drawdown of the present inventory.

The $83.1 million requested is for procurement of [deleted] AIM–7F missiles for $77 million and $6.1 million to support AIM–7E missiles already in the fleet. Initial spares require an additional $0.8 million.

Missile Improvement and Cost Increase

Chairman Ellender. The cost of this missile is now [deleted] per missile as compared to [deleted] per missile for the 7E verision. What have we added that has increased the cost so much?

Admiral WEISNER. Generally speaking, what we are trying to achieve is much greater reliability in the circuits, much better tracking capability and improvements in the capability to operate in an electronic countermeasures environment.

Captain TIMIDAISKI. The major difference between the E2 and the 7F, is that in the 7F we have gone to solid state technology and transistors, this increases the hardware cost. Also greatly increased performance has been built into the missile. As Admiral Weisner said. the improvements we are requesting have also added to the cost of the missile.

Chairman ELLENDER. What improvement will it have over the present one?

Captain TIMIDAISKI. It has roughly [deleted] the performance capability throughout the envelope that we have in the E2 missile today.

Chairman ELLENDER. When you say [deleted] the performance capability, to what do you refer?

Captain TIMIDAISKI. [Deleted] the range within which it can intercept an enemy aircraft. It also has an overtake capability which we didn't have before.

MISSILE MISSION AND CHARACTERISTICS

Chairman ELLENDER. Describe the method of firing and the objective.

Captain TIMIDAISKI. It is carried on the F–4 aircraft in the Navy, Air Force, and Marines right now, and is ejected from the bottom of the aircraft. It is carried in a semisubmerged belly as well as on pylons. It has some capability against small surface targets on the sea but it is primarily an air-to-air weapon system or a ground-to-air weapon in the case of the basic point defense system.

Chairman ELLENDER. What is the length of the missile?

Captain TIMIDAISKI. It is roughly 12 feet long.

NEED FOR ADDITIONAL EQUIPMENT

Chairman ELLENDER. With respect to the $6.1 million requested for the support of the Sparrow AIM–7E, I note the following statement on page 73 of the justifications, "The AIM–7E support funds ($5.1 million) will finance training material, depot checkout equipment, technical engineering services, and publications required to maintain the operational readiness of that missile in the fleet. The remaining AIM–7E support funds ($1 million) are required to support the ship-to-air version of the AIM–7E Sea Sparrow." Inasmuch as you are not procuring any more of these versions of the Sparrow missile, why is it necessary to procure additional training materials, depot checkout equipment, technical engineering services, and publications?

Admiral MCCLELLAN. There are approximately [deleted] AIM–7E and AIM–7E–2 missiles in the inventory today. At the current rate of expenditures, we will have AIM–7E–2 missiles in the inventory through fiscal year [deleted]. Support of these missiles will be required

throughout their lifetime and yearly support funding will be requested at a reduced rate throughout this period. Many of these missiles will be expended in the training environment as the AIM–7E and the AIM–7E–2 are replaced by the newer AIM–7F model. Approximately $4.4 million of the requested $5.1 million in fiscal year 1973 will be expended on 433 UHF telemetry packs which will be used in the training environment. The remaining portion will be used to incorporate changes in the depot checkout equipment to reflect those changes in the fiscal year 1972 missile procurement, to procure 3 additional DPM–14A test equipments, to update training aids, acquire 3 man-years of technical services, and to update and correct existing publications and manuals. The $1 million requested to support the AIM–7E Sea Sparrow will be expended in much the same way.

NEED FOR FUNDS FOR SHIP-TO-AIR VERSION

Chairman ELLENDER. Just what is involved in this request of $1 million to support the ship-to-air version of the AIM–7E Sea Sparrow version of this missile?

Admiral MCCLELLAN. The approximate $1 million requested to support the ship-to-air version of the AIM–7E Sea Sparrow is broken down in the following manner: $11,000 for special depot handling equipment; $23,000 for special ship handling equipment; $11,000 for nonexpendable training material; $621,000 for expendable training material; $298,000 for technical engineering services; and $56,000 for publications.

7F VERSION OF SPARROW PROCUREMENT COST

Senator YOUNG. I note that the procurement unit cost of this initial production of the 7F version of the Sparrow missile is [deleted]. What is your estimated procurement unit cost of this missile based on the production of the total requirement of [deleted] missiles?

Admiral MCCLELLAN. The estimated procurement unit cost of the AIM–7F based on the total purchase of [deleted] missiles is [deleted].

INCREASE IN 7F COSTS

Chairman ELLENDER. Again referring to the 7F Sparrow program, I note that the initial planning estimate for this program was $453.6 million, including $24.9 million for R. & D., based on the production of [deleted] missiles. The current total estimated cost of this program is $927.5 million, including $71.3 million for R. & D., based on the production of [deleted] missiles. Could you comment on the reasons for the increase in the cost of this program?

Admiral MCCLELLAN. The AIM–7F program was initially planned as a 2-year development program to be followed by a 5-year production program for a total of [deleted] missiles. The actual program, as currently approved, now includes a 5½-year development program

and a 10-year production program for a total of [deleted] missiles. I will provide additional details for the record.

(The information follows:)

The cost increase of $473.8 million can be attributed to the following:

a. $64.9 million for a quantity change which included the procurement of 50 additional R&D missiles, and an increase of [deleted] production missiles.

b. $8.7 million for engineering changes associated with a cost reduction program, value engineering program, and adapting the missile to ship-to-air applications.

c. $7.1 million for support changes. This covers the initial spares which were not reported in the development estimate.

d. $109.7 million schedule change. Support of in-house field stations during the extended development program. Contractor flight test, and missile and analysis support during the extended development program. A change in annual buys, less missiles per year over a longer period with production at or below minimum sustaining rate for 3 years. The cost impact is estimated at $7,000 per missile.

e. $37.0 million unpredictable changes. Naval Industrial Funding (NIF) concept becomes effective at Naval Field Stations which adds approximately $3,000 per missile.

f. $238.8 million economic change. The original estimate was based on FY 68 dollars. The current estimate includes a 4 percent escalation per year through FY 72, and a 3 percent per year thereafter.

g. $7.6 million estimating change. Redefinition of Fleet Support and Special Tooling plus other support costs.

Chairman ELLENDER. As I recall, the Air Force's request includes funds for the procurement of this missile in fiscal year 1973. Am I correct about this?

Admiral MCCLELLAN. Yes, the Air Force has requested funds to procure 100 AIM–7F missiles in fiscal year 1973.

Chairman ELLENDER. Thank you.

SIDEWINDER MISSILES

The next item to be considered is the request of $26.8 million for the procurement of Sidewinder air-to-air missiles. The missile data sheet will be included in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE—MISSILE DATA SHEET

Service: Navy—Nomenclature: AIM–9H/L; P–1 Line Item No. 71; Popular Name: Sidewinder IC IR.

Description/Mission.—AIM–9H is an air-to-air missile carried by Navy and Marine Corps fighter/attack aircraft for use against all enemy aircraft but optimized for bomber aircraft. [Deleted]. The AIM–9L is optimized for dogfighting, fighter against fighter. It features [deleted] improved fuzing and warhead design, increased maximum range and decreased minimum range capability, and increased seeker sensitivity over earlier Sidewinders. It is designed to be compatible with all current Navy/Marine Corps Sidewinder capable aircraft and also selected Air Force aircraft. The AIM-9H/L may be used with the [deleted] systems engineering improvements which increase missile [deleted] during air combat maneuvering.

COST DATA

[In millions of dollars]

	Fiscal year—								Cost to complete	Current estimate, total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity					[Deleted]					
Cost	14.0	33.9	12.0	26.8	31.8	19.8	13.2	12.0		163.5
Procurement unit cost					[Deleted]					
Weapon system cost	14.0	33.9	12.0	26.8	31.8	19.8	13.2	12.0		163.5
Initial spares	.2	.3	.2	.7	.8	1.1	1.0	.7		5.0
R.D.T. & E				6.7	.5					7.2
Milcon										
Program acquisition cost	14.2	34.2	12.2	34.2	33.1	20.9	14.2	12.7		175.7
Program unit cost										[Deleted
Total additional cost		.8	.2	.2	.3	.4	.4	.4		

Basis for fiscal year budget request:

Funding for [deleted] AIM–9H missiles is requested to provide an increment toward the inventory objectives, replacing older war reserve missiles used in operational training of aircrews. AIM–9L development and production funds are needed to continue engineering design efforts, manufacture 13 R. & D. missiles for technical evaluations, and fabricate [deleted] pilot production missiles. The AIM–9L provides an improved [deleted] missile for Navy and Air Force fighter and attack aircraft including the F–14, F–15, AV–8A and AX aircraft.

Test Data:

AIM–9H:

Navy Technical Evaluation

Started—Oct 1970
Completed—Apr 1971
Box Score [Deleted]

During the testing program, an incompatibility between AIM–9H and the F–8 aircraft weapon control systems was discovered. This incompatibility was corrected with minor changes to the missile and the aircraft weapon control system. Also a defective diode was discovered in the environmental qualification program. An improved diode has been provided for all FY 1971 and 1972 missiles.

Operational evaluation (OPEVAL) (12 planned firings)

Started—November 1971
Estimated completion—March 1972
Box score—[Deleted].

The purpose of the OPEVAL is to determine the inner boundary of the firing envelope. The classification of success/failure/no test is based on proper missile performance without regard to the final determination of inner boundary.

AIM–9L:

Navy Technical Evaluation: [Deleted] firings scheduled, phase I [deleted].
Operational Evaluation: [Deleted] firings scheduled, phase II [deleted].

CONTRACT DATA

[Guidance Control Group: Raytheon Corp., firm fixed price, Philco-Ford Corp., firm fixed price]

[Deleted.]

	AIM–9H	AIM–9L
Characteristics:		
Launch weight	195 lbs	195 lbs.
Warhead weight	25 lbs	25 lbs.
Length/span	9 ft/5 in	9 ft/5 in.
Guidance type	[Deleted] infrared seeker	Same as AIM–9H with a more sensitive seeker.
Warhead type	Continuous rod	[Deleted.]
Inventory objective/requirements:		
End of fiscal year 1973 funded delivery period, [deleted].		

PRODUTION DATA

[Deleted.]

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement		$192.2
R.D.T. & E.		60.5
Milcon		
Total program costs		252.7
Current estimate total program (fiscal year 1972 budget submission):		
Procurement		530.2
R.D.T. & E.		58.9
Milcon	[Deleted	
Total program		559.1
Current estimate total program (fiscal year 1973 budget submission):		
Procurement		168.5
R.D.T. & E.		7.2
Milcon		
Total program costs		175.7

Difference between fiscal year 1972 and fiscal year 1973 submissions:

The significant quantity decrease in the Sidewinder results from: (1) exclusion of the earlier model AIM–9D/G missiles from this year's data sheet, whereas these models were included in last year's data sheet [delete], (2) reduction of the required quantity of AIM–9L missiles based on the planned availability of the AGILE missile subsequent to fiscal year 1977 [deleted]. A decrease in R.D.T. & E. funds also results when the earlier model AIM–9D, G missiles are excluded from this year's data sheet.

Admiral WEISNER. The Sidewinder is a heat-seeking missile used by fighter and attack aircraft of the Navy, Marine Corps and Air Force. Developed in 1955 and improved over the subsequent years, it has been our most effective air-to-air missile.

AIM–9H VERSION

AIM–9H is a solid-state Sidewinder with better performance, reliability and maintainability. It offers a significant improvement in close-in tracking of a meaneuvering target. Through reduced rework and repair needs, dollar savings over the years will accrue.

AIM–9L VERSION

AIM–9L will be a greatly improved new version of Sidewinder for the Navy/Air Force. It will have a new seeker, fuze and warhead. Inclusion of these items will result in a higher kill probability and a much larger launch envelope.

AGILITY REQUISITE

Combat with MIGS and a great amount of experimental work have emphasized the essential nature of the United States need to have a more maneuverable, and more agile, air-to-air missile.

1973 PROCUREMENT AND FUNDING

We are requesting $26.8 million which will provide for [deleted] AIB–9H ($12.1 million) and [deleted] AIM–9L ($14.7 million). Initial spares require an additional $0.7 million.

Chairman ELLENDER. How much will this missile cost in comparison with those you now have on hand? I believe the cost of the Sidewinder is [deleted]?

Admiral WEISNER. That is correct, Mr. Chairman. That is what we show right here.

COMPARISON OF FLYAWAY UNIT COSTS

Chairman ELLENDER. Is that the cost of those on hand or the new procurement order?

Admiral WEISNER. This is a combination price for the total program of procurement.

Chairman ELLENDER. [Deleted.] What is the difference in cost per missile of the ones you have on hand in contrast to the ones you are going to purchase?

Captain SCHULTE. If I understood the question correctly, sir, the present flyaway cost for the missile, the 9G, is around [deleted] per copy. The program cost is greater.

The present flyaway cost of the 9H now under contract will be around [deleted] per missile, and we are estimating for the AIM–9L, which is an estimate, not under contract, about [deleted] per copy, sir.

Chairman ELLENDER. You do not have that one in inventory now, do you?

Captain SCHULTE. The L is under development. It is a joint development for the Air Force and Navy to meet both of their requirements.

MANUFACTURERS

Senator YOUNG. Who manufactures them?

Captain SCHULTE. The guidance section is made by Raytheon and also by Philco-Ford, and occasionally, by General Electric. We have other components and they are all competitively bid and they change each year.

CHARACTERISTICS OF AIM–9H AND AIM–9L COMPARED

Chairman ELLENDER. Could you be more specific in comparing the characteristics of the existing AIM–9H SIDEWINDER to the new AIM–9L version of this missile?

Admiral WEISNER. The AIM–9L will be very similar to the AIM–9H but it will have [deleted] warhead and [deleted] fuze for a better kill capability, and the missile will incorporate the seeker element cooling bottle in the missile to enable USAF aircraft to use this missile without modifying their missile launchers.

Chairman ELLENDER. Is this the initial procurement of the 9L version of the Sidewinder missile?

Admiral MCCLELLAN. Yes, sir.

NUMBER OF MISSILES

Senator YOUNG. I note on the missile data sheet a reference to [deleted] Sidewinder missiles. Does this include the 13 R. & D. missiles?

Admiral MCCLELLAN. The 13 R. & D. missiles are included in the total Navy quantity of [deleted]. In addition, the remainder of the [deleted] includes procurement of [deleted] AIM–9H's and [deleted] AIM–9L missiles.

Chairman ELLENDER. Are these 13 R. & D. missiles to be procured with procurement funds or the request of $6.7 million for R. & D.?

Admiral MCCLELLAN. The 13 R. & D. missiles are to be procured with the requested $6.7 million of R. & D. funds.

DEMONSTRATION OF REQUIREMENTS

Chairman ELLENDER. On page 3 of the missile data sheet under the performance data for both the AIM–9H and the AIM–9L Sidewinder missiles, I note that none of the stated requirements for these missiles has yet been demonstrated in the test program. When do you expect these requirements to be demonstrated?

Admiral WEISNER. Although the AIM–9H OPEVAL is not completed, a significant part of the performance requirements have been met. [Deleted] firing tests to date have been successful and have demonstrated maximum speed to Mach [deleted], maximum range of [deleted], and altitude capability from [deleted]. Although the high altitude goal [deleted] has not been demonstrated, it appears assured because of the significant increase in missile stability over the AIM–9D which has been demonstrated at that altitude. The AIM–9H has also demonstrated improved tracking rates and an improved inner range boundary over the AIM–9D. The other [deleted] firings resulted in [deleted] "no test" and [deleted].

[Deleted] AIM–9L [deleted] fired to date [deleted]. The AIM–9L performance will be fully demonstrated during the Navy technical evaluation now scheduled for completion [deleted].

Senator YOUNG. Inasmuch as your test program has not yet demonstrated these stated requirements, just why do you feel you are justified in requesting funds for the production of these missiles?

Admiral WEISNER. The major design improvement in the AIM–9H has been the improved tracking rate and improved inner range boundary. The AIM–9H has demonstrated all performance requirements except the maximum altitude [deleted]. The demonstration of this parameter has been limited [deleted].

PHOENIX MISSILES

Chairman ELLENDER. If there are not any further questions on the Sidewinder missiles, we will proceed with the consideration of the request for $94.8 million for the procurement of Phoenix missiles. The missile data sheet will be included in the record at this point.

(The information follows:)

Fiscal Year 1973 President's Budget Estimate—Missile Data Sheet

Service: Navy.—Nomenclature: AIM–54A; P–1 Line Item: 72; Popular name: Phoenix.

Mission/Description.—Phoenix is a supersonic, all weather, long range air-to-air missile with semi-active mid-course and active terminal guidance and long range (60+ nautical miles) standoff capability. Six missiles can be carried abroad the F–14. Near simultaneous launch against six targets in an all weather, heavy jamming environment is possible.

COST DATA

[Dollars in millions][1]

	Fiscal year—								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]
Cost	841.	87.5	91.1	94.8	125.7	116.1	111.4	115.2	194.9	1,020.8
Procurement unit cost	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]	[deleted]
Weapon system cost	84.1	87.5	91.1	94.8	125.7	116.1	111.4	115.2	194.9	1,020.8
Initial spares	2.2	4.0	13.3	5.3	8.3	6.9	5.6	6.0	12.9	64.5
R.D.T. & E	158.1	3.0	1.5	2.0	1.6					[2]166.2
Milcon										
Program acquisition cost	244.4	94.4	105.9	102.1	135.6	123.0	117.0	121.2	207.8	1,251.4
Program unit cost										[deleted]
Total additional cost					2.5	5.1	8.1	9.7		26.4

[1] Does not add due to rounding.
[2] AWG-9 development funding not included.

Note: Basis for fiscal year 1973 request: The [deleted] Phoenix missiles requested in the fiscal year 1973 budget are an increment toward the inventory objective and will be utilized to meet planned F-14 deployment.

Test Data

All major performance objectives of the Phoenix missile have been demonstrated in a most extensive test program prior to production. Testing accomplished on the 73 missiles completed to date includes:

42 missiles have been launched since mid-1966; 4 were scored "no-test" and 27 scored as "hits" for a success ratio of 71%;
475 captive flights have been accomplished;
18,650 hours system tests have been completed;
over 3000 hours factory system tests are completed;
925 hours of environmental testing have been completed;
460 hours of structural testing have been completed;
joint contractor-Navy electronic countermeasures evaluation was accomplished;
independent Navy laboratory evaluation has been accomplished;

Critical milestones leading to a July 1973 initial operational capability (IOC) of the F–14/AIM–54A weapons system are as follows:

NPE No. 2 (Navy preliminary evaluation), June 1972.
Contractor demonstration, December 1972–April 1973.
NTE (Navy technical evaluation), June 1972–July 1973.
BIS (Board of inspection and survey) trials, February 1973–June 1973.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Missile system	Hughes Aircraft	Fixed price incentive.
Rocket motor	North American Rockwell Corp., Rocketdyne Division	Subcontractor.
	Aeroject General Corp	Do.
Radome	Corning Glass	Do.

	Classification	Requirement	Demonstrated
Performance:			
Speed, maximum	C	Not specified	[Deleted] mach.
Range:			
Maximum		50 nautical miles	60 nautical miles.
Minimum	C	Not specified	[Deleted] nautical miles.
Altitude:			
Maximum launch	C	[Deleted] ft	[Deleted] ft.
Maximum missile	C	[Deleted] ft	68,000 ft.
Reliability		[Deleted] percent	Not demonstrated operationally.
Kill probability		[Deleted]	Do.
Characteristics:		AIM-54A:	
Launch weight	C	[Deleted] lbs	
Warhead weight	C	[Deleted] lbs	
Length/diameter	U	156/15 inches	
Guidance type	U	Radar plus doppler; semiactive/active modes.	
Inventory Objective/Requirements: End fiscal year 1973 funded delivery period	[Deleted].		

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	[Deleted]	$442.4
R.D.T. & E.	45	94.0
Milcon		
Total	[Deleted]	536.3
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	[Deleted]	1,085.6
R.D.T. & E.	37	165.7
Milcon		
Total	[Deleted]	1,251.3
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	[Deleted]	1,085.3
R.D.T. & E.	37	166.2
Milcon		
Total	[Deleted]	[1] 1,251.4

[1] Does not add due to rounding.

Difference between fiscal year 1972 and fiscal year 1973 submissions:

The missile quantity decrease is based on a revised requirements calculation by the Navy. Total planed funding has not changed due to the anticipated effects of current inflationary trends on future year costs. The cost per missile has increased approximately 3 percent over last year's cost estimate.

PHOENIX (AIM–54A)

Admiral WEISNER. The Phoenix is a long-range air-to-air missile utilizing semiactive midcourse guidance and active terminal guidance. It is controlled by the long-range airborne weapons control system (AWG–9) in the F–14.

Near simultaneous launch and simultaneous guidance of up to six Phoenix is possible against widely separated aircraft or missile targets in an all-weather, heavy ECM jamming environment.

The R. & D. test program has been extremely successful. In test firings to date, a success rate of 72 percent has been achieved. Initial F–14 Phoenix firings are planned at NAS Point Mugu in April 1972. The F–14/Phoenix board of inspection and survey (BIS) trials will be completed in June 1973, with initial operating capability (IOC) in July 1973.

1973 PROCUREMENT AND FUNDING

The $94.8 million requested in fiscal year 1973 to procure [deleted] Phoenix missiles is required to continue an orderly build-up of fleet inventory to support F–14 deployments. An additional $5.3 million is required for initial spares.

PHOENIX CAPABILITY

Chairman ELLENDER. Just what can the Phoenix missile do that cannot be accomplished with the 7F version of the Sparrow missile?

Admiral MCCLELLAN. The Phoenix missile has a [deleted] increase in range over the AIM–7F version of the Sparrow missile. In addition, Phoenix missile system has the capability to fire up to six missiles simultaneously against widely spaced targets and maintain tracks of up to 18 additional targets while Sparrow 7F can only track and fire against one target at a time. The Phoenix has many orders of magnitude of increased capability over Sparrow 7F against electronic counter measures by virtue of the AWG–9 and Phoenix missile design. The Phoenix missile with its inherent long range multishot capability is the only viable alternative to combat the high speed, high altitude Foxbat threat and counter saturation tactics against the fleet.

REDESIGNING OF ORIGINAL MISSILE

Chairman ELLENDER. Wasn't the Phoenix conceived to be used on the F–111?

Admiral WEISNER. The TV guided Condor air-to-surface missile to a long-range, rocket-powered cruise missile that provides a standoff capability of [deleted/ nautical miles against selected high priority land and sea targets in heavily defended areas.

Chairman ELLENDER. To be used on the F–14?

Admiral WEISNER. To be used in the F–14; yes, sir.

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ORIGINAL AND REDESIGNING COSTS

Chairman ELLENDER. Please provide for the record the costs incurred in the development of the Phoenix missile for the F–111B program as well as the costs associated with its development for the F–14.

Admiral WEISNER. Yes, sir.

(The information follows:)

At the time of the change to F–14 in FY 1968 approximately $500 million had been spent for the F–111B version of the PHOENIX Missile system, including the AWG–9.

UNIT FLYAWAY AND PROGRAM COSTS

Chairman ELLENDER. How much do these missiles cost apiece? Is it [deleted] per missile?

Admiral WEISNER. That is the total program unit cost. The flyaway cost for the missiles we are talking about here is [deleted].

PRODUCTION SCHEDULE

Senator YOUNG. Is your production schedule for the Phoenix missile coordinated with the current production schedule of the F–14 aircraft?

Admiral MCCLELLAN. Yes, sir.

SOLE USE ON F–14

Chairman ELLENDER. As I understand it, neither the Navy or the Air Force has any plans to carry the Phoenix missile on any aircraft other than the F–14. Am I correct about this?

Admiral MCCLELLAN. Yes, sir.

TOTAL PRODUCTION

Chairman ELLENDER. On page 1 of the missile data sheet, I note that the current estimated total program is based on the production of [deleted] Phoenix missiles. Was this total requirement changed when a decision was made to reduce the number of F–14 aircraft in the currently approved program from something over 700 to 313, and if it wasn't changed, why wasn't it?

Admiral MCCLELLAN. The Phoenix missile procurement is planned in proportion to the threat. The missiles are used to counter the por-

tion of the threat assigned to Phoenix which has not changed by virtue of the decreased F–14 program procurement. The quantity of aircraft serves to define the rate at which the Phoenix is used against the threat Comparably the number of guns serve to define the rate at which the ammunition can be fired at the enemy.

Chairman ELLENDER. On page 4 of the data sheet, under cost history comparison, I note that the initial planning estimate for the Phoenix was $536.3 million, including $94 million for R. & D., based on the production of [deleted] missiles. The current total estimated cost of this program is $1,251.4 million, including $166.2 million for R. & D., based on the production of [deleted] missiles. What was the date of the initial planning estimate?

Admiral MCCLELLAN. This initial planning estimate was made on 29 June 1963.

INCREASE IN COST

Senator YOUNG. Generally speaking, what accounts for the tremendous increase in the cost of the Phoenix missile program?

Admiral MCCLELLAN. The increased unit costs reflect the economic inflation that has occurred since 1963. The increased quantity of missiles [deleted] coupled with the economic inflation combine to increase the total program cost.

CONDOR MISSILE

Chairman ELLENDER. The next item is the request of $13 million for the procurement of the TV-guided CONDOR air-to-ground missile. The missile data sheet will be included in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE—MISSILE DATA SHEET

Service: Navy—Nomenclature: AGM–53A; P–1 line item: 74; popular name: Condor.

Description/Mission.—Condor is a medium range, supersonic, cruise missile with a conventional warhead which utilizes electro-optical guidance. It carries a television camera which views the area ahead of the missile. The operator fires the missile and by use of a data link communications system controls the camera and missile remotely. He can thus search the area, locate the target, lock the missile tracker onto the selected target and update the missile aim point if desired to achieve a more effective impact location. Use of this system will allow attack aircraft to deliver a warhead without exposing the launch aircraft to the effective envelope of known or predicted enemy surface-to-air defense systems.

COST DATA

[In millions of dollals]

	Fiscal year—								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Procurement:										
Quantity	108.0	----------	20.0	[Deleted]						
Cost				13.0	[Deleted]				----------	187.1
Procurement unit cost				.325					----------	[Deleted]
Weapon system cost				13.0					----------	187.1
Initial spares				----------					----------	9.0
R.D.T. & E.	125.0	23.3	21.5	6.1					----------	181.5
Milcon				----------					----------	----------
Program acquisition cost	125.0	23.3	21.5	19.1					----------	377.6
Program unit cost									----------	[Deleted]
Total additional cost				11.4	[Deleted]				----------	78.9

Note: Basis for fiscal year 1973 request: The $13,000,000 requested in fiscal year 1973 provides [deleted] Condor missiles for an initial operational capability early [deleted].

Test data:

a. Navy technical evaluation ..... [Deleted]
b. Complete Quasi/OPEVAL ..... [Deleted]

During contractor demonstration there were [deleted] test firings, [deleted] successful and [deleted] partially successful. These firings have demonstrated the complete system including data link control to impact at [deleted] nautical mile range. The first NTE test firing is planned for [deleted].

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
Prime contractor	North American Rockwell	Cost plus award fee.
Data link	Hughes Aircraft Co	Subcontract.
Propulsion	Rocketdyne Division of North American Rockwell	Subcontract.

Performance Data [Deleted.]

COST HISTORY COMPARISON

	Quantity	Amount
Initial planning estimate:		
Procurement	[Deleted]	$315.0
R.D.T. & E	108	126.0
Milcon		
Total	[Deleted]	441.0
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	[Deleted]	98.6
R.D.T. & E	138	194.2
Milcon		
Total	[Deleted]	292.8
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	[Deleted]	196.1
R.D.T. & E	128	181.5
Milcon		
Total	[Deleted]	377.6

Difference between FY 1972 and FY 1973 submissions

The planned procurement quantity has been increased based on the successful completion of the contractor demonstration. These tests have shown that CONDOR can perform credibly against a wider spectrum of targets than was envisioned last year. After completion of the NTE/quasi-OPEVAL, the utility and capability of the CONDOR weapon system will again be reassessed, and the total weapon requirements determined.

Admiral WEISNER. The TV guided Condor air-to-surface missile to a long-range, rocket-powered cruise missile that provides a standoff capability of [deleted] nautical miles against selected high priority land and sea targets in heavily defended areas.

The Condor missile system has a [deleted] data link, automatic midcourse guidance which provides the capability to navigate to the target area, command guidance and aim-point selection, [deleted] capabilities which provide exceptionally high accuracy and probability of target kill.

The key elements of accomplishing target acquisition, identification, and lockon after launch, with the inherent capability to have the aircraft select the best avenues of approach for penetration and escape [deleted] provide a significant advancement in tactical missiles.

TESTS

There have been eight fully successful R. & D. firings to date which have demonstrated the capabilities of the Condor missile system including [deleted] warhead effectiveness against a destroyer escort target. Navy technical and preliminary operational testing is scheduled to be completed in [deleted].

PLANNED PROGRAM, 1973 FUNDING AND UNIT COST

The $13 million in our fiscal year 1973 request provides for first increment procurement of [deleted] Condor missiles for full Navy operational testing and limited Fleet introduction.

Chairman ELLENDER. I notice these missiles cost [deleted] each.

Admiral WEISNER. That is correct, Mr. Chairman; the total program unit cost.

Chairman ELLENDER. It is based on acquisition of [deleted] missiles, according to information which was given to me.

Admiral WEISNER. That is correct, sir.

Chairman ELLENDER. You have none in inventory?

Admiral WEISNER. No, sir; this is initial procurement. This is a new TV-guided missile.

PILOT AND OPERATIONAL MISSILES

Chairman ELLENDER. You refer to the 1973 request as the first increment procurement. I note that 20 of these missiles were funded in fiscal year 1972. Do you consider these 20 the pilot production as distinguished from operational missiles?

Admiral MCCLELLAN. The 20 missiles funded in fiscal year 1972 are development missiles being used for evaluation purposes. The [deleted] requested in fiscal year 1973 are pilot production articles which will be used to evaluate the production configuration and provide an initial fleet capability.

TARGETS

Senator YOUNG. Give us some examples of the types of targets that you would use a Condor missile to destroy.

Admiral McClellan. Potential Condor targets are ships, bridges, thermal powerplants, airfields, SAM sites, dam and dike systems and similar high value and/or high risk targets requiring surgical precision.

Condor Missile Carriers

Chairman Ellender. What Navy and Marine Corps aircraft will carry the Condor missile?

Admiral McClellan. The A–6E TRAM aircraft is being modified to carry the Condor missile; the A–7 could also be modified to carry Condor.

Demonstration of Condor Missile Requirements

Chairman Ellender. As I read the performance data on page 2 of the missile data sheet, all of the required performance characteristics of the Condor missile have been demonstrated. Am I reading this information correctly?

Admiral McClellan. All of the required performance characteristics capable of being demonstrated have been demonstrated. Kill probability and reliability are not susceptible to demonstration from the eight successful launches which proved the accuracy, speed, range, altitude and other performance characteristics.

Standard Missile

Chairman Ellender. The next item is the request of $44.9 million for the procurement of the medium range Standard missile and $15.6 million for the procurement of the extended range Standard missile. The missile data sheets for these missiles will be included in the record at this point.

(The information follows:)

Fiscal Year 1973 President's Budget Estimate—Missile Data Sheet

Service: Navy—Nomenclature: Standard Missile Medium Range; P1 Line Item No. 77.91; Popular Name: Standard-MR

Description/Mission.—A supersonic medium range missile which provides all weather, anti-aircraft and surface-to-surface armament for destroyers and incorporates advanced solid-state electronic and engineering concepts. Standard MR is able to defend against high performance aircraft and missile targets flying at speeds up to [deleted]. It is also required to operate effectively against sophisticated electronic Counter-measures.

COST DATA

[In millions of dollars]

	Fiscal year								Current estimate total program [1]
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	
Missile procurement, quantity	[Deleted.]								
Missile procurement, cost	80.4	24.6	30.6	44.9	55.4	60.2	53.1	55.1	404.3
Procurement unit cost	[Deleted.]								
Weapon system cost	80.4	24.6	33.6	41.9	55.4	60.2	53.1	55.1	404.3
Initial spares	1.1					.8			1.9
R.D.T. & E.	45.6	1.8	9.2	10.4	.5	.4	.2		68.1
Milcon									
Program acquisition cost	127.1	26.4	39.8	55.3	55.9	61.4	43.3	55.1	474.3
Program unit cost	[Deleted.]								
Total additional cost (modif)	1.1	.5	1.8	1.0	1.0	1.0	1.0	1.0	8.4

[1] Reflects program through fiscal year 1977. Procurement is required beyond fiscal year 1977 to compensate for yearly fleet training firings and to account for introduction into the fleet of new ships. Fiscal year 1974 through fiscal year 1977 requirements are based on current approved DNFYDP of January 1972.

[2] Development for STD MSL was pursued as a single program, therefore, costs are not identifiable to STD ER and STD MR individually—50 percent allocated to each missile.

Basis for FY 1973 Request.—Requirements for the FY 73 Procurement are calculated to approach approved inventory objectives and replace firing expenditures. The FY 73 procurement of [deleted] STANDARD MR's continues the phased replacement of TARTAR in [deleted] cruisers and [deleted] destroyers. Also included in the STANDARD MR request is funds for the procurement of [deleted] Pilot line SSM Standard active missiles which provide the surface fleet with a rapid improvement in anti-ship capability to offset the current enemy missile threat. The active terminal guidance locates and intercepts the target; thus eliminating the present need for continuous radar illumination of the target by the firing ship. This missile configuration will be compatible with all ships capable of firing the operational semi-active STANDARD Missiles (DDG, DLG's, DEG's and PG's). The future quantity mix of STD Semi-active and SSM–STD active has not yet been determined.

Test Data:

STANDARD MISSILE was approved for service use on 25 June 1970. Results of Techeval, Opeval and current firing data are provided as follows:

PERFORMANCE

[Deleted]

Characteristics	Standard MR	SSM-standard active
Guidance	CW semiactive homing	Pulse doppler.
Altitude	[Deleted]	[Deleted].
Diameter	13.5	13.5.
Length	176 inches	186 inches.
Propulsion	Solid rocket	Solid rocket.
Launch Weight	1,360 pounds	1,411 pounds.
Warhead weight	137	150.
Warhead type	HE continuous rod	Blast frag.

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
G. & C	General Dynamics, Pomona; Pomona, Calif	MYCFP.
Ordnance (TDD MK-45)	Motorola, Inc. (GED), Scottsdale, Ariz	CPIF.
DTRM–MK 56	Hercules Powder Co. (ABL), Cumberland, Md.; NOS, Louisville, Ky. (metal parts).	MYCFP.
Warhead	Naval Ordnance Station, Louisville, Ky.; G. W. Galloway, Baldwin Park, Calif.	
Safety and arming device	Piqua Engineering Inc., Piqua, Ohio	MYCFP.

Requirements—Production Data—Losses and Assets.

Production Data: [Deleted].

PRESIDENT'S BUDGET ESTIMATE—MISSILE DATA SHEET

Service: Navy—Nomenclature: Standard Missile Extended Range; P–1 Line Item No. 79, 92; Popular Name: STANDARD ER.

Description/Mission: A supersonic extended range Missile which provides all weather anti-aircraft and surface-to-surface armament for cruisers, aircraft carriers and guided missile frigates and incorporates advanced solid-state electronics and engineering concepts. STANDARD ER is able to defend against high performance aircraft and missile targets flying at speeds up to [deleted]. It is also required to operate effectively against sophisticated electronic countermeasures.

COST DATA

	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Current estimate total program [2]
				Fiscal year—					
Missile procurement:									
Quantity	[Deleted]								
Cost	171.4	34.0	32.9	15.6	24.7	32.3	30.3	30.1	371.3
Procurement unit cost	[Deleted]								
Weapon system cost	171.4	34.0	32.9	15.6	24.7	32.3	30.3	30.1	371.3
Initial spares	1.1					.7			1.8
R.D.T. & E.[1]	45.6	1.8	9.3	10.3	.5	.4	.3		68.2
Milcon									
Program acquisition cost	218.1	35.8	42.2	25.9	25.2	33.4	30.6	30.1	441.3
Program unit cost	[Deleted]								[Deleted]
Total additional cost (Modif)	2.6	.8	1.5	.9	.8	.8	.9	1.0	9.2

[1] Development for STD MSL was pursued as a single program, therefore, costs are not identifiable to STD ER and STD MR individually—50 percent allocated to each missile.

[2] Reflects program through fiscal year 1977. Procurement is required beyond fiscal year 1977 to compensate for yearly fleet training firings and to account for introduction into the fleet of new ships. Fiscal year 1974 thru fiscal year 1977 requirements are based on current approved DNFYDP of January 1972.

Basis for FY 1973 Request.—Requirements for the FY 73 procurement are calculated to approach approved inventory objectives and replace firing expenditures. The FY 73 Procurement of [deleted] STANDARD ER's continues the phased replacement of TERRIER in [deleted] frigates.

Test Data.—STANDARD MISSILE was approved for service use on 25 June 1970. Results of TECHEVAL, OPEVAL and current firing data provided as follows:

PERFORMANCE

[Deleted.]

Characteristics of *STANDARD ER:*
Guidance: CW Semi-Active Homing.
Altitude: [Deleted].
Diameter: 13.5.
Length: 314".
Propulsion: Solid Rocket.
Launch Weight: 2,930 lb.
Warhead Weight: [Deleted].
Warhead Type: HE Continuous Rod.
Production Data: [Deleted].

CONTRACT DATA

Major subsystem	Contractor	Type of last contract
G. & C	General Dynamics/Pomona; Pomona, Calif	MYCFP
Ordnance (TDD MK-45)	Motorola, Inc. (GED); Scottsdale, Ariz	CPIF
Sustainer MK 30	Atlantic Research Corp.; Alexandria, Va	MYCFP
Warhead	Naval Ordnance Station, Louisville, Ky	
Booster MK 12	G. W. Galloway, Baldwin Park, Calif	
	Naval Ordnance Station, Indian Head, Md	
Safety and arming device	Cameron Iron Works, Houston, Tex	
	Piqua Engineering, Inc.; Piqua, Ohio	MYCFP

COST HISTORY COMPARISON

Initial planning estimates [1]	Quantity	Amount (millions)
Procurement	[Deleted]	$251.5
R.D.T. & E		61.7
Milcon		
Total program costs		313.2

[1] This estimate was made in 1964 as part of the advanced procurement plan. Cost is the total planned cost for fiscal year 1965–70. Costs were not identified to standard MR and ER individually. Standard missile is not included in SAR reporting.

	Standard MR		Standard ER		Total	
	Quantity	Amount (millions)	Quantity	Amount (millions)	Quantity	Amount (millions)
Total program acquisition cost (fiscal year 1972 budget submit):						
Procurement	[Deleted]	$325.2	[Deleted]	$341.3	[Deleted]	$6.65
R.D.T. & E		57.3		57.4		114.7
Milcon						
Total program costs		382.5		398.7		781.2
Total program acquisition cost (fiscal year 1973 budget submit):						
Procurement	[Deleted]	402.9	[Deleted]	373.9	[Deleted]	776.8
R.D.T. & E		68.1		68.2		136.3
Milcon						
Total program costs		471.0		442.1		913.1

Brief explanation of differences between FY 72 and FY 73 Budget Submit: Total program procurement costs for STANDARD MISSILE increased $110.3M from $666.5M in FY 72 to $776.8M in FY 73. $85.2M of this increase is attributable to the add on of FY 77. $13.8M of the increase is attributable to the procurement of the [Deleted] SSM–STANDARD ACTIVE Missiles in FY 73. The remaining increase of $11.3M is attributable to costs for procurement of improvements, mid-course guidance and the [Deleted] Fuze for STANDARD MISSILE. RDT&E costs increased $21.6M from $114.7M in FY 72 to $136.3M in FY 1973. The increase is attributable to the development of an [Deleted] System which will provide a significant Interim Surface-to-Surface capability to the fleet.

STANDARD MISSILE (MEDIUM RANGE AND EXTENDED RANGE)

Admiral WEISNER. The standard missile is employed in two versions that differ mainly in propulsion. Both versions are used primarily as antiaircraft and antimissile weapons aboard our surface combatants. They are also effective in the surface-to-surface mode against ships and surface targets.

The Medium Range Standard, with a range of [deleted] nautical miles, is the replacement for Tartar on our smaller combatants, and as the secondary missile battery in three of our Talos cruisers.

The Extended Range Standard, with a range of [deleted] miles, is a follow-on weapon for terrier configured guided missile frigates, cruisers and aircraft carriers.

1973 PROCUREMENT AND FUNDING

Both Standard versions provide for improved overall performance, reliability, multiple target discrimination and electronic countermeasures.

We are requesting $44.9 million and [deleted] medium range missiles plus $15.6 million and [deleted] extended range missiles.

An additional $16.9 million is requested to fund Fleet support requirements for other in-service missiles which are no longer in production.

MISSILE MISSION

Chairman ELLENDER. Will this be fired from a ship?

Admiral WEISNER. Yes, sir; this is fired from a ship against an air target or it can be fired against a surface target or missile target.

Chairman ELLENDER. Could it be used on land?

Admiral WEISNER. I would see no reason why it could not be made compatible for use in a land environment.

Captain SAPPINGTON. This system was used by the Marines 10 years ago in its earlier version. It is no longer used from land. It is similar to the Army's program called Hawk, similar in performance except the Hawk is used from the land and this is used from a surface Navy ship.

Chairman ELLENDER. Describe the targets it would be employed against.

Captain SAPPINGTON. It is used to shoot at aircraft targets, at missile targets and at ship targets on the sea. It is not used to shoot against a target on the ground ashore.

Replacement for Tartar Missile

Chairman Ellender. As I recall, the medium-range Standard missile is for the replacement of the earlier Tartar missiles. Am I correct about this?

Admiral Weisner. Yes, you are correct.

Chairman Ellender. How many ships do we have in the fleet that are equipped with the Tartar missile, and are they all destroyers?

Admiral Weisner. Currently there are [deleted] Tartar ships in the fleet consisting of [deleted] destroyers and [deleted] cruisers.

Senator Young. When you replace the Tartar missile with the medium-range Standard missile, do you have to modify any of the equipment aboard the ship?

Admiral Weisner. Yes, minor changes are required to the weapon system. Launcher systems are modified to identify missile round, fire control systems hardware/software is modified to provide for the increased number of frequency channels which can be used by the medium-range Standard missile and switchboards are modified for system compatibility.

Replacement for Terrier Missile

Chairman Ellender. The extended-range Standard missile is a replacement for the earlier Terrier missile on board ships, as I recall. Is this correct?

Admiral Weisner. Yes, you are correct.

Chairman Ellender. What type of ships are equipped with the Terrier missiles and how many of these ships do we have in the fleet?

Admiral Weisner. Currently there are [deleted] Terrier ships in the fleet consisting of [deleted] DLGs, [deleted] CLGs, [deleted] and [deleted] CVAs.

Chairman Ellender. When do you expect to have all of the earlier Terrier and Tartar missiles replaced with the Standard missile?

Admiral Weisner. No specific date has been planned for replacement of all the earlier Terrier and Tartar missiles, since there are several factors which influence these assets.

In the case of Terrier, total replacement cannot be realized because of [deleted] requirements (only BT missiles apply) and certain ship class requirements. Existing weapon system configurations restrict certain ships to the use of BTs only, while others are restricted to the use of BTs and HTs. However, it is planned that by fiscal year 1977 [deleted] of the [deleted] operational Terrier ships will be utilizing only Standard ER missiles and Terrier BTs. While Tartar ships are not restricted to the use of older missiles, complete phase-out of Tartar ITs depends on peacetime expenditures and on future Standard MR procurements. Navy's goal is to have only Standard MR assets for Tartar ships by fiscal year 1980.

Shrike Missiles

Senator Young. Just what is involved in the request of $700,000 for the support of Shrike missiles?

Admiral McCLELLAN. Fiscal year 1973 funds are required for depot checkout equipment at three weapons stations and Naval Magazine, Subic Bay. Special handling equipment is required for restraining the motor and for the procurement of DSM–76 and DSM–68 test equipment for ships and naval air stations. Non-expendable training materials are required for special targets in fleet training ashore and afloat. In addition, expendable training materials are required for pilot training. Funds are also required for technical services, maintenance training, and change analysis. Publication funds are required for updating of publications, training manuals, assembly and checkout, support and test equipment, and repair manuals.

STANDARD ARM MISSILES

Chairman ELLENDER. Please comment on the $800,000 requested for the support of Standard ARM missiles.

Admiral McCLELLAN. I will be glad to provide that information for the record.

(The information follows:)

The Standard ARM fleet support costs are required as follows:

1. Depot Checkout and Special Handling Equipment	$250,000
Follow-on buy of intermediate-level depot checkout and special handling equipment to provide a more comprehensive in-house repair capability of the Standard ARM and support equipment.	
2. Expendable Training Material	30,000
To provide updating of Fleet Training material, i.e., sound slides, handbooks, diagram schematics and films.	
3. Technical Engineering Services	300,000
Funds required to provide 9 man-years of technical field engineering support—This consists of 6 man-years of Navy in-house support and 3 contractor field engineers services including back-up for training, maintenance, and engineering assistance. This support will be applicable to 3 CVA's/squadrons, 2 Naval Air Stations and 1 Naval Air Repair Facility.	
4. Publications	220,000
Funds required to update depot and intermediate level maintenance manuals.	
Total	800,000

TARTAR MISSILES

Chairman ELLENDER. What is involved in the request of $3.9 million for the support of Tartar missiles?

Admiral WEISNER. The $3.9 million requirement for RIM–24B Tartar consists of $.8 million for depot checkout equipment and special handling equipment; $2.3 million for expendable training material to provide UHF telemetry units for noncombat missile firing allowance; and $.8 million for technical engineering services at Naval weapons stations and contractors.

TERRIER MISSILES

Chairman ELLENDER. Please comment on the request of $3.9 million for the support of the Terrior missile.

Admiral WEISNER. The $3.9 million requirement for the RIM–2E Terrier consists of $.4 million for depot checkout equipment and special handling equipment; $2.9 million for UHF telemetry units

for noncombat missile firing allowance; and $.6 million for technical engineering services and publications.

TALOS MISSILES

Senator YOUNG. Just what do you plan to do with the $5.8 million you are requesting for the support of the Talos surface-to-air missile?

Admiral WEISNER. The $5.8 million requirement for the RIM–8G Talos consists of $2.4 million for depot checkout equipment and special handling equipment to be used at the Depot Level Maintenance Facility at NWS Yorktown; $1.3 million for expendable UHF telemetry units to support the non-combat firing allowance; $1.8 million for technical engineering services at various contractors and Naval Weapons Stations; and $.3 million for Talos Homing Ordalt (7376) documentation.

SUBROC MISSILES

Chairman ELLENDER. Comment on the request for $1.8 million for the support of Subroc missiles.

Admiral WEISNER. $1.8 million is for support of the Subroc missile system in the fleet. Included in this effort is updating of fleet documentation, procurement of training material and for the upkeep of the gage and quality assurance systems servicing the flow of material.

AERIAL TARGETS

Chairman ELLENDER. The next item is the request of $36.8 million for the procurement of aerial targets. The information on pages 77 and 78 of the justification pertaining to this request will be included in the record at this point.

(The information follows:)

The fiscal year 1973 budget request includes the following amounts for procurement of aerial targets and initial spares. (The initial spares funds are justified in Budget Activity 11.)

[Dollars in millions]

Target	Quantity	Procurement	Initial spares	Total procurement cost
BQM–34A	112	$12.6	$0.8	$13.4
BQM–34E	20	6.9	.6	7.5
AQM–37A	202	4.6		4.6
MQM–74A	208	8.9	.5	9.4
Other targets	(1)	3.8	.3	4.1
Total		36.8	2.2	39.0

[1] Not available.

These targets are designed to provide realistic presentations of potential targets, and are used in developing, testing and evaluating Navy missiles. Targets are also used for training and for maintaining the skills of Navy personnel in the use of missiles and antiaircraft guns.

The recoverable BQM–34A drone simulates subsonic aircraft and is used in the Navy's air-to-air and surface-to-air missile testing and training programs. The recoverable BQM–34E and nonrecoverable AQM–37 provide simultations of high performance, supersonic aircraft for evaluation and training requirements. The recoverable, subsonic MQM–74A, is primarily required for anti-aircraft gunnery exercises.

The other target funds will finance conversion of T–33 aircraft into drones for development and test programs requiring a full-sized target, support costs for CQM–10A (Bomarc) supersonic drones used in missile evaluation programs and fleet missile exercises, and procurement of a variety of low cost targets required for training purposes.

Admiral WEISNER. We are requesting continued procurement of aerial targets in fiscal year 1973. These targets include recoverable and nonrecoverable types and are designed for realistic presentation of potential targets. They are used for training and in developing, testing, and evaluating Navy missiles.

1973 PROCUREMENT AND FUNDING

The majority of the request of $36.8 million is for procurement of four target types: The recoverable BQM–34A drone simulates subsonic aircraft; the recoverable BQM–34E and nonrecoverable AQM–37A simulate high performance supersonic aircraft; and the recoverable MQM–74A is a subsonic target required for anti-aircraft gunnery exercises.

The balance of our request is for a variety of tow targets for gunnery and air-to-air missile training and to convert obsolete T–33 aircraft to drones for missile development and test programs requiring full-sized targets.

Associated initial spares is $2.2 million for a total of $39 million.

Chairman ELLENDER. This conversion is of existing planes no longer usable.

CONVERSION OF OBSOLETE AIRCRAFT TO DRONES

Admiral MCCLELLAN. These are old obsolete planes that have been in existence since 1950. We convert those as needed; as we shoot up some we convert a few more.

It is the only way we have to realistically simulate a real airplane for testing missile applications.

MISSILES SUPPORT

Admiral WEISNER. The balance of our request for missile funds includes dollars for modification of existing missiles, spare parts to support new procurement and existing fleet missiles, and funds for industrial facilities and the astronautics program.

MISSILE MODIFICATIONS

Chairman ELLENDER. Admiral, before you proceed with your discussion of the missile modification program, I would like to have included in the record pages 79 and 80 of the justifications.

(The information follows:)

MODIFICATION OF MISSILES

Fiscal year 1973 estimate	$26,200,000
Fiscal year 1972 estimate	20,475,000
Fiscal year 1971 actual	27,385,000

PURPOSE AND SCOPE OF WORK

Funds budgeted in Activity 10 provide for modification of Fleet missiles to assure maximum effectiveness and reliability, enhance performance, and increase maintainability by incorporating improvements resulting from technical advances.

JUSTIFICATION OF FUNDS

The FY 1973 request for missile modification programs is $26.2 million. This budget request includes $14.3 million for air-launched missile modifications and $11.9 million for surface-launched missile modifications.

In the air-launched missile category, the primary emphasis is on modifying BULLDOG missiles, while small amounts are budgeted for SPARROW, SIDEWINDER, and SHRIKE modifications.

12.6 million is requested in FY 1973 for [deleted] BULLDOG modifications. [Deleted]. The resulting air-to-surface weapon will be utilized by Marine Air Forces in A–4M aircraft for close support of troops. [Deleted]

The test program for BULLDOG has been successful thus far. Of 21 test shots, [deleted] been successful and [deleted] partially successful and [deleted] failures. The test program was completed in October 1971. The FY 1973 program will provide an increment toward the BULLDOG inventory objective.

SPARROW modifications, budgeted at $1.1 million, involve the installation of the AIM–7E–2 modification in [deleted] AIM–7E missiles. This modification, which results from air-to-air combat in Southeast Asia, reduces the minimum launch range at which SPARROW can be fired from approximately [deleted]. This is the fifth year for this successful program, which has completed all testing. Funds are also budgeted over-age rocket motors for safety reasons.

SIDEWINDER modification funds, budgeted at $0.2 million, provide for the modification of depot and intermediate level test equipment to make it compatible with the [deleted].

The SHRIKE program, budgeted at $0.4 million, includes minor modifications designed to update previously procured missiles to the latest configuration, thereby insuring the fullest effectiveness of existing assets.

The surface-launched missile modification budget of $11.9 million for FY 1973 represents a decrease of $1.8 million from the FY 1972 level. The FY 1973 program continues the required modifications for the surface-launched STANDARDS (MR and ER), TERRIER, TARTAR, and TALOS missiles. The modification programs for TERRIER ($.7 million) and TARTAR ($.6 million) include improvements to the reliability and operational readiness of these missiles. The TALOS program ($8.5 million) includes modification to the guidance system to improve performance against [deleted]. This program also includes an [deleted] which greatly increases performance against [deleted] and eliminates the time-consuming requirement to select an air- or surface-fuzing mode prior to launch. The STANDARD missile program ($1.9 million) includes an improved fore and aft fuze which significantly enhances the ordnance effectiveness of the missile against [deleted]. The modification program for SUBROC ($0.2 million) incorporates improvements to extend the service life of test sets.

MISSILE MODIFICATION

Admiral WEISNER. The fiscal year 1973 request for missile modification is $26.2 million. These funds porvide for modification of fleet missiles to insure effectiveness and reliability, enhance performance, and increase maintainability by incorporating improvements resulting from technical advances.

FUNDS FOR MISSILE MODIFICATION

Chairman ELLENDER. Please provide for the record a P–1 type tabulation listing each of the missiles included in your request for $26.2 million for modifications and the amounts for each. Also include the

amounts for each of the missiles included in your programs for fiscal years 1971 and 1972.

Admiral McCLELLAN. I will be happy to furnish that.

(The information follows:)

[In millions of dollars]

Item	Fiscal year—		
	1971	1972	1973
AIM-7E/F (Sparrow III)	4.7	1.4	1.1
AIM-9 (Sidewinder IC IR)	.8	.2	.2
AGM-45A (Shrike)	.6	.4	.4
AGM-78D (Standard arm)	11.0		
AGM-83A (Bulldog)		4.8	12.6
RIM-24B (Tartar)	.7	.9	.6
RIM-2E (Terrier)	.6	.4	.7
RIM-8G (Talos)	7.6	9.0	8.5
RIM-66A (Standard MR)	.5	1.8	1.0
RIM-67A (Standard ER)	.8	1.5	.9
UUM-44A (Subroc)	.1	.1	.2
Total	27.4	20.5	26.2

BULLDOG MISSILES

Chairman ELLENDER. Just what is involved in the request for $12.6 million for the modification of Bulldog missiles, and indicate the added capabilities that will result from these modifications and the number of missiles included in the planned program.

Admiral McCLELLAN. The Bulldog is an air-to-surface missile designed primarily for use in close air support of troops. [Deleted.]

Chairman ELLENDER. I note that $5.2 million was made available during fiscal 1972 for the modification effort. What was accomplished with those funds?

Admiral McCLELLAN. [Deleted.]

TALOS MISSILES

Senator YOUNG. Comment on your planned program for the modification of Talos missiles for which you are requesting $8.5 million.

Admiral WEISNER. The $8.5 million provides for modifying the RIM–8G Talos missile to the new RIM–8J missile configuration. This program is a continuation of the modifications initiated in fiscal year 1971. These modifications provide for significant increases in the Talos missile capability and thereby increased defense for carrier striking forces as follows:

(a) Improvement of the [deleted].

[Deleted.]

The RIM–8J modifications were flight tested during development assist test D/S 579 in November 1971 resulting in [deleted]. These modifications have been accorded "high priority" by CNO in light of their contribution to Fleet AAW readiness. The RIM–8J capability (in limited quantities) is currently operational in U.S.S. *Long Beach* in the Seventh Fleet and will be installed on the remaining Talos Cruisers during fiscal year 1973/74.

SPARROW MISSILES

Chairman ELLENDER. Just what is involved in your request of $1.1 million for the modification of Sparrow missiles?

Admiral McClellan. The funds budgeted for Sparrow modifications involve the installation of the AIM–7E–2 modification in [deleted] AIM–7E missiles. This modification, which results from air-to-air combat in Southeast Asia, reduces the minimum launch range at which Sparrow can be fired from approximately [deleted] feet to [deleted] feet. Fiscal year 1973 is the fifth year for this successful program which has completed all testing. Funds are also budgeted to regrain over-age rocket motors for safety reasons.

MISSILE SPARES AND REPAIR PARTS

Chairman Ellender. The next item is the request of $18.6 million for the procurement of missile spares and repair parts. Pages 81 and 82 of the justification will be included in the record at this point.

(The information follows:)

Fiscal year 1973 estimate	$18,600,000
Fiscal year 1972 estimate	31,186,000
Fiscal year 1971 actual	21,924,000

Budget Activity 11: Missile Spares and Repair Parts

PURPOSE AND SCOPE OF WORK

Spares and repair parts are required to support deployment and maintenance necessary to insure maximum readiness of the missile and aerial target systems procured under Budget Activities 8 and 9, and missile modifications budgeted in Activity 10. To meet these requirements, funds are budgeted for the procurement of both initial (or investment) and reparable replenishment spares and repair parts.

JUSTIFICATION OF FUNDS

Expendable items, such as guided missiles and non-recoverable target drones, require spares and repair parts for the repair of missiles or components which are worn out or damaged while in the Fleet. For recoverable target drones, additional spares/parts are required to repair damage incurred in flight and recovery operations and for control and telemetry equipment.

$12.5 million is requested for initial spares and spare parts as shown in the following table:

Missile	Navy support	Contractor support	Total
Poseidon	$2,800		$2,800
Sparrow	100	$700	800
Sidewinder	600	100	700
Phoenix	700	4,600	5,300
Shrike	100		100
Subroc	300		300
Aerial targets	2,200		2,200
Bulldog	100	200	300
Total	6,900	5,600	12,500

Requirements for Navy initial spare parts support are determined by detailed provisioning procedures, and the spare parts are procured in conjunction with the end-item. The provisioning procedures used for computing requirements are based on a number of factors, such as the use of the end-item, usage rate trends, engineering judgment, and surveillance program data.

In addition, for new and sophisticated missiles, the initial spares estimate includes an amount for "contractor support" of the system prior to operational service. Such contractor support takes the form of providing spare parts before Fleet usage data is available or missile design is frozen. Contractor support for SPARROW and SIDEWINDER is required only for the latest versions of these

missiles, the AIM–7F and the AIM–9L. Any assets remaining at the end of the contractor support phase are applied against future Navy spares/spare parts requirements. $5.6 million is budgeted for contractor support in FY 1973.

The total amount requested for initial spares in FY 1973 is $11.9 million less than the $24.3 million budgeted in FY 1971. This decrease is primarily related to decreased POSEIDON, PHOENIX and Aerial Target requirements.

Requirements for replenishment spares/spare parts are derived utilizing a stratification technique similar to that employed in deriving aircraft replenishment requirements. Briefly this technique considers the number of missiles in the Fleet, Fleet data of spare parts usage, RFI (ready-for-issue) spares returning from rework and repair programs, and equipment leadtimes to derive net fiscal year budget requirements. In FY 1973, replenishment spares/spare parts are required as follows:

Ballistic Missiles	$1,000,000
Air-to-air/air-to-surface	2,800,000
Surface-to-air/surface-to-surface	2,300,000
Total	6,100,000

This represents a decrease of $.7 million below the FY 1972 program.

Admiral WEISNER. Missiles spares and repair parts are required to support deployment and maintenance necessary to insure readiness of the missile and aerial target procurement and missile modification.

To meet this requirement, we are requesting $12.5 million for initial or investment spares and $6.1 million for replenishment spares.

A total of $18.6 million is requested for missile spares in fiscal year 1973.

INITIAL SPARES TO SUPPORT NEW MISSILES

Senator YOUNG. With respect to the $12.5 million requested for initial spares for support of new missiles being procured or modified, I note that this is broken down into $6.9 million for Navy support and $5.6 million for contractor support. Just what is meant by the terms "Navy Support" and "Contractor Support"?

Admiral MCCLELLAN. Contractor support refers to an interim arrangement whereby the contractor is obligated to furnish spares support for the missiles on an as-required basis. This type of support is normally used only during the early stages of a missile program, when the missile configuration is undergoing change and the inventory is relatively low.

Navy support refers to all the rest of the missile's service life. During this period the Navy procures and stocks the spare parts necessary to repair missiles, based on spare parts usage data.

MISSILE SUPPORT EQUIPMENT AND FACILITIES

Chairman ELLENDER. The next item is the request of $46.7 million for the activity entitled "Missile support equipment and facilities." Pages 83, 84, 85 and 89 of the justifications will be included in the record at this point.

(The information follows:)

BUDGET ACTIVITY 12: MISSILE SUPPORT EQUIPMENT AND FACILITIES

Fiscal year 1973 estimate	$46,700,000
Fiscal year 1972 estimate	15,638,000
Fiscal year 1971 actual	12,055,000

PURPOSE AND SCOPE OF WORK

Funds budgeted under Activity 12 provide missile industrial facilities, support the Navy's astronautics program, and procure satellites, launchers, and associated equipment for the Fleet Satellite Communications System.

The Fleet Satellite Communications (FLTSATCOM) system will be a world-wide, all-weather, UHF communications system which will provide a communication broadcast service to all Navy ships, certain Navy aircraft and selected Air Force units.

The missile industrial facilities program finances facility expansion, general-purpose industrial production and testing equipment and facility maintenance necessary for the production of missiles.

The Navigation Satellite System (NAVSAT) is a world-wide, all-weather system which enables ships to determine their positions from readings taken during a single pass of an orbiting satellite. The Navy NAVSAT was developed to meet the requirement of Fleet Ballistic Missile (FBM) submarines for precise positional information. In recent years other naval vessels as well as some commercial ships have acquired the necessary receiving sets to utilize the NAVSAT system as a navigation aid. The operational requirement promulgated by the Chief of Naval Operations is to enable users of the system to fix their position within one-tenth of a nautical mile at a median maximum interval of one hour. This creates a requirement for a constellation of at least four satellites in well-spaced orbits.

JUSTIFICATION OF FUNDS

The FY 1973 budget request of $46.7 million includes $32.1 million for the Fleet Satellite Communications System, $11.2 million for the Missile Industrial Facilities program, and $3.4 million for the NAVSAT program. As compared with with the FY 1972 estimate, this request represents a net increase of $31.1 million.

FLEET SATELLITE COMMUNICATIONS SYSTEM—$32.1 MILLION

The Fleet Satellite Communications (FLTSATCOM) System satisfies the Navy's urgent worldwide UHF mobile user communications requirments. This includes protected fleet broadcast service to all Navy ships plus a vital command control service to all ASW platforms, FBM submarines, aircraft carriers, and cruisers and selected aircraft, ships and submarines. In addition, the system is capable of satisfying the Air Force equatorial satellite communications requirements including presidential, airborne command post, Strategic Air Command and emergency mission support communications. A constellation of [deleted] each having an effective radiated power of more than [deleted] is needed to meet the designated Navy and Air Force UHF communications requirements. Satellite launch dates have been selected to minimize the impact on operational forces due to the demise of two R&D communications satellites which have predicted useful lifetimes to Calendar Years (CYs) 1973 and 1974 and constitute the only available mobile user satellite communications capability. Accordingly, the target launch date for the first operational satellite is late [deleted] with a full operational constellation in orbit before the end of [deleted].

The Navy has been designated by the Office of the Secretary of Defense as the executive service for the overall FLTSATCOM system with the USAF assigned as a participating organization. Within the USAF, the Space and Missile System Organization (SAMSO) has been delegated responsibility, under the Navy Space Project Manager, for the acquisition, launch, test and evaluation of the space segment of the FLTSATCOM system.

The $32.1 million requested includes $27.5 million for launch vehicles and related engineering effort, and $4.6 million for advance procurement of satellite subsystems.

The $27.5 million provides for procurement of [deleted] ATLAS/CENTAUR launch vehicles, advance procurement of propulsion and guidance hardware for a [deleted] launch vehicle, and engineering services for payload integration and mission trajectory software. In addition to launch vehicles, $4.6 million is budgeted for advance procurement of long leadtime subsystems for [deleted] satellites. These subsystems include: communications repeaters; telemetry tracking and command; antennae; electrical power equipment; control systems, propulsion; and material and effort for structural assembly.

MISSILE INDUSTRIAL FACILITIES—$11.2 MILLION

The FY 1973 estimate of $11.2 million for missile industrial facilities includes funds for five categories of production support, including one item of new construction. The first of these categories, restoration and replacement of machine tools and related production equipment, accounts for $4.9 million of the estimate. This pogram is designed to provide and maintain an efficient and economical production capability through the procurement of modern machine tools to replace obsolete equipment or the restoration or modification of tools which are worn or require up-dating. Inefficient government-owned equipment is replaced or rehabilitated only when: (1) the contractor is unwilling or unable to fund the project; (2) when the project will reduce the end-item costs to the government and improve the industrial readiness posture; and (3) when capital maintenance is required in accordance with contractual obligations. All actions undertaken in this program are subjected to close scrutiny to assure rapid amortization of procurement costs and maximum practicable usage of tools in inventory.

The second category, capital maintenance, emergency repairs, and fire protection improvements, is budgeted at $3.0 million in FY 1973. The funds provide for non-recurring capital maintenance at government-owned missile producing industrial plants as well as emergency repairs and improvements designed to reduce fire and other hazards.

The third category, new production manufacturing and test facilities, is budgeted at $.8 million, including $.4 million to expand the PHOENIX assembly and test complex at Hughes Aircraft Corp., Tucson, Arizona. Additional justification is provided in the following Facilities Acquisition Project Data sheet.

The fourth category, production engineering and manufacturing technology, is budgeted at $.8 million. This category provides various means of identifying limiting industrial capacities and of developing corrective actions, including new or technologically advanced methods of manufacture for the purpose of retaining, broadening or modernizing a capable industrial base.

The fifth category, stock surveillance equipment, is budgeted at $1.7 million in FY 1973, an increase of $.9 million over FY 1972. The funds are for the procurement of test equipment utilized to monitor the quality and reliability of the air-launched missile stockpile and to assure that complete missile rounds are maintained in the highest possible state of readiness, consistent with specification requirements. Surveillance is also directed at identifying factors responsible for degradation of the stockpile and recommending corrective action. The increased funding being provided for this category reflects a recognition of the need to improve the quality of missile stock surveillance.

ASTRONAUTICS—$3.4 MILLION

The FY 1973 estimate of $3.4 million for astronautics provides for launch and satellite support costs. The launch support request of $2.2 million consists of fixed costs and variable costs which are dependent upon the launch rate planned to maintain the satellite constellation.

The satellite support estimate of $1.2 million is for periodic tests, repairs and refurbishment of the satellites in storage awaiting launch.

Additional justification is provided in the Strategic System Project Office Program Budget Book for FY 1973.

Admiral WEISNER. Funds requested under missile support equipment and facilities provide missile industrial facilities and supports the Navy astronautics program.

The missile industrial facilties program finances general-purpose industrial production and testing equipment and other facilities necessary for the production of missiles. The astronautic program provides for the procurement of communication and navigation satellites and boosters as well as supporting equipment and services.

FLEET SATELLITE COMMUNICATION SYSTEM

Included in this year's request is funding for the fleet satellite communications (FLTSATCOM) system. The Navy has been designated

by OSD as the executive service for the FLTSATCOM system with the Air Force as a participating organization.

The fleet satellite communications system is needed to improve Navy and Air Force worldwide mobile user communications.

The system will provide for long-range command control communications to all ASW platforms, TACAMO aircraft, FBM and nuclear attack submarines, aircraft carriers, and other selected ships.

The system also satisfies Air Force equatorial satellite communication requirements including presidential, airborne command post, SAC and emergency mission support communications.

Target launch date for the first of [deleted] operational satellites is late calendar year [deleted] with a full operational constellation in orbit before the end of [deleted].

$32.1 million is requested for initial procurement of [deleted] vehicles and advanced procurement of long leadtime satellite items.

FLEET SATELLITE COMMUNICATION SYSTEM

Senator YOUNG. What is the total estimated cost of the fleet satellite communication system?

Admiral MCCLELLAN. The estimated cost to the Navy for design, test, evaluation, and procurement of launchers, satellites and associated Navy shipboard and shore terminals is [deleted] through fiscal year 1979. The cost of Air Force terminals is not included in this estimate.

Chairman ELLENDER. I wish you would provide a detailed statement for the record on this system and also include a detailed statement on the total estimated cost of the source of these funds by fiscal year through completion.

Admiral MCCLELLAN. The fleet satellite communications system is designed to [deleted].

(Classified information was furnished to the committee.)

Chairman ELLENDER. Please comment on each of the projects included in the request of $11.2 million for missile industrial facilities.

Admiral MCCLELLAN. I will be happy to supply that information for the record.

(The information follows:)

Missile industrial facilities projects

NAD Crane	$392,000	NAVFAC Administrative Fees	$77,000
WPNSTA Concord	86,000	NWIRP, Bedford, Mass	350,000
WPNSTA Yorktown	98,000	NWIRP, Bristol, Tenn	330,000
WPNSTA Seal Beach	313,000	NWIRP, McGregor, Texas	550,000
NAVPRODSTA Indian Head	1,669,000	Raytheon, Lowell, Mass	270,000
NAVORDSTA Louisville	555,000	Air Force Plant No. 44, Tucson, Ariz	400,000
ABL, Pinto	459,000	Fees	94,000
NIROP, Pittsfield	2,764,000		
NIROP, Pomona	393,000	Total	8,800,000

The above projects include replacement and restoration of machine tools and other related equipment; non-recurring maintenance of a capital nature, emergency repairs, safety and fire protection improvements; new production facilities to support new weapons programs; and production engineering and manufacturing technology measures.

The balance of the $11.2 million consists of:

Stock Surveillance Equipment	$1,700,000
Strategic Systems Project Office Requirements	700,000

ASTRONAUTICS

Chairman ELLENDER. Just what is involved in the request of $3.4 million for astronautics?

Admiral WEISNER. These funds are required to support the Navy navigation satellite system. This system is a worldwide, all-weather navigation aid for Polaris and Poseidon submarines. The system enables the submarine to determine its position to within one-tenth nautical mile from data collected from a single pass of an orbiting satellite. These satellites are the primary source of navigation fix information for fleet ballistic missile submarines. A four-satellite constellation has been maintained since March 1968. Five satellites have been in operation since August 1970 when the fifth satellite was launched to alleviate a precession problem.

The fiscal year 1973 request includes $2,185,000 for launch support and $1.215,000 for satellite support. The launch support involves fixed costs of $1,845,000 and variable costs of $340,000. The fixed costs include the cost of the contractor launch team, sustaining costs of the Scout booster program in maintaining reliability, configuration control, storage and checkout programs, and travel funds required by the Air Force for use in performing their supervisory functions. The same fixed costs apply regardless of the number of launches. The variable cost is predicated on the number of planned launches and includes the cost of augmenting the launch team for a short period just prior to launch and minor reimbursable costs to the Air Force for items such as nitrogen and photography.

Satellite support provides services in connection with satellites stored and awaiting launch. These services include standby spacecraft tests, long-term storage tests, solar blade tests, installation of batteries prior to launch, repairs and refurbishment to the satellite and engineering support. In addition, technical consulting and monitoring services, failure aalysis studies, discrepancy reporting, security devices and technical assistance to design groups are provided with regard to maintaining satellite reliability.

1973 FUNDING

In summary, the fiscal year 1973 request of $46.7 million includes $11.2 million for the missile industrial facilities program, $3.4 million for the astronautics program, and the $32.1 million needed for FLTSATCOM.

MISSILE PROCUREMENT BUDGET RE UEST

Our total fiscal year 1973 missile request is $769.6 million.

PAMN BUDGET REQUEST

New obligation authority in the amount of $3,871.2 million is requested.

Chairman ELLENDER. That concludes your testimony?

Admiral WEISNER. Yes, Mr. Chairman.

QUESTIONS BY SENATOR THURMOND

Chairman ELLENDER. Senator Thurmond was unable to be here today but has asked that questions submitted by him be answered for the record.

The questions and the responses will appear at this point.

(The information follows:)

EFFECT OF CARRIER REDUCTION ON NEED FOR AIRCRAFT

Senator THURMOND. Admiral Weisner, would the Navy need all the new aircraft covered in your statement even if the carrier force is reduced to 12?

Admiral WEISNER. Yes. As I have stated, Senator, in some of our aircraft programs, we are not buying sufficient aircraft to meet peacetime attrition, particularly in the TACAIR community. The fiscal year 1973 request is a very austere procurement plan that is necessary if we are to continue modernization of our aging and less capable aircraft forces and to replace attrited aircraft, regardless of carrier force levels. [Deleted.]

COST OF CVA CONVERSION TO CV MULTIPURPOSE CARRIER

Senator THURMOND. What is the cost and type of modification required to convert a CVA to a CV multi-purpose carrier?

Admiral WEISNER. The average shipyard installation and hardware cost to configure a S–2 capable CV with an ASCAC for acoustic data processing is $3.5M. The average modification cost for a S–3 CV equipped with a TSC (Tactical Support Center) is $6.7M per carrier.

NAVY CLOSE AIR SUPPORT REQUIREMENT

Senator THURMOND. Admiral, how does the Navy determine the extent of its close air support force when weighed against the Marine close air capability?

Admiral WEISNER. Though none are dedicated to this mission, all Navy fighter and attack aircraft are capable of performing the close air support mission. The Navy/Marine close air support command and control system is capable of using any and all of these assets depending on the situation. Navy and Marine Corps fighter and attack aircraft have always had the basic characteristics required for close air support; that is, excellent load carrying capability, accuracy, endurance, maneuverability and survivability. Aircraft such as the A–6E and A–7E are optimized for the attack role and are, I believe, overall the most capable aircraft available today for the close air support role.

Senator THURMOND. How many close air support planes does the Navy presently have in its inventory?

Admiral WEISNER. Though not dedicated to the close air support mission, the number of aircraft presently in the Navy's active inventory that could provide close air support are:

Model:

	Active inventory
F–8:	
U.S.N.	[Deleted]
U.S.N.R.	50
F–4:	
U.S.N.	[Deleted]
U.S.N.R.	—
A–7:	
U.S.N.	[Deleted]
U.S.N.R.	26
A–4:	
U.S.N.	[Deleted]
U.S.N.R.	70
A–6:	
U.S.N.	[Deleted]
U.S.N.R.	—

Senator THURMOND. What is the life expectancy of these planes?

Admiral WEISNER. The life expectancy of the Navy's close air support planes is as follows: [Deleted.]

A–7E FLYAWAY COST

Senator THURMOND. What is the flyaway cost of the Navy's A–7E close air plane?

Admiral WEISNER. As you well appreciate, procurement costs are extremely responsive to production quantities. To illustrate this effect, with both Air Force and Navy procurement in FY 72, the flyaway unit cost was $2.678 million, while the cost projections for FY 73, 74 and 75 are $3.62 million. [Deleted] [Deleted] respectively, based on close-out of the Air Force procurement with the FY 72 buy.

TRANSPORTATION OF HARRIER

Senator THURMOND. Does the Navy presently have the needed ships to transport the Harrier squadrons if these aircraft had to be deployed?

General HILL. Yes, Sir. Marine Corps plans are to deploy one AV–8A squadron permanently to the Western Pacific and the remaining two squadrons will be based in the Continental limits of the United States. In the event of future conflict in the Western Pacific, the deployed squadron would be commited. Transport would be provided by the operational commander on the scene from organic assets. In case of conflict in areas other than in the Western Pacific, one U.S. based squadron would be deployed while the remaining squadron remained in the United States to provide support. The options available to transport the AV–8A are amphibious shipping, shipping currently in the reserve fleet in the event of full mobilization and, most importantly, flight ferry using the AV–8A in-flight refueling capability.

IMPACT COST OF A–7D LINE CLOSURE

Senator THURMOND. If the Air Force A–7D line is closed how will this impact on the Navy A–7E costs?

Admiral WEISNER. As a result of the Air Force dropout in FY 73, the unit flyaway cost for the Navy A–7E will increase approximately $1.0 million per unit. This is primarily due to airframe and engine related costs that are inherent in the Navy's assumption of overhead costs previously shared with the Air Force. At the production rate planned for fiscal year 1973, the engine unit cost is $877,000. If the Air Force stays in the A–7 program and/or the Swiss enter, the increased production would keep the engine program far more feasibly economical.

SUBCOMMITTEE RECESS

Chairman ELLENDER. Thank you very much.

The subcommittee will be in recess until Monday morning at 10 o'clock.

(Whereupon, at 12:50 p.m., Thursday, March 2, the subcommittee was recessed, to reconvene at 10 a.m., Monday, March 6.)

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1973

MONDAY, MARCH 6, 1972

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee met at 10 a.m., in room S–126, the Capitol, Hon. Allen J. Ellender (chairman) presiding.

Present: Senators Ellender, Young, Allott, and Cotton.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE NAVY

SHIPBUILDING AND CONVERSION, NAVY

STATEMENT OF VICE ADM. JEROME H. KING, JR., U.S. NAVY, DEPUTY CHIEF OF NAVAL OPERATIONS FOR SURFACE WARFARE

ACCOMPANIED BY:

REAR ADM. NATHAN SONENSHEIN, U.S. NAVY, COMMANDER, NAVAL SHIPS SYSTEM COMMAND
REAR ADM. SAM H. MOORE, U.S. NAVY, DIRECTOR OF BUDGET AND REPORTS, OFFICE OF THE NAVY COMPTROLLER
REAR ADM. F. H. PRICE, U.S. NAVY, DIRECTOR, SHIP ACQUISITION AND IMPROVEMENT DIVISION, OPNAV
REAR ADM. R. Y. KAUFMAN, U.S. NAVY, DIRECTOR, STRATEGIC SUBMARINE DIVISION, AND ULMS PROGRAM COORDINATOR
REAR ADM. HARVEY LYON, U.S. NAVY, PROGRAM MANAGER FOR ULMS
REAR ADM. ISHAM W. LINDER, U.S. NAVY, CVN PROGRAM COORDINATOR
COMDR. J. A. BUCK, U.S. NAVY, OFFICE OF THE CHIEF OF NAVAL OPERATIONS (SURFARE)
CAPT. W. F. ENGEL, U.S. NAVY, COMPTROLLER, NAVAL SHIP SYSTEMS COMMAND
COMDR. J. L. WILSON, U.S. NAVY, OFFICE OF THE CHIEF OF NAVAL OPERATIONS (SURFARE)
R. A. DAVIDSON, OFFICE OF THE NAVY COMPTROLLER

1972 APPROPRIATION AND 1973 BUDGET REQUEST

Chairman ELLENDER. The subcommittee will come to order.

The next appropriation to be considered is "Shipbuilding and conversion, Navy."

The fiscal year 1973 budget estimate is $3,564,300,000. The amount appropriated for fiscal year 1972 was $3,005,200,000.

PROGRAM AND FINANCING

Chairman ELLENDER. At this point in the record there will appear certain program and financing information from the justifications.

(The information follows:)

DEPARTMENT OF DEFENSE—MILITARY SHIPBUILDING AND CONVERSION, NAVY

PROGRAM AND FINANCING (IN THOUSANDS OF DOLLARS)

	Budget plan (amounts for procurement actions programed)			Obligations		
	1971 Actual	1972 estimate	1973 estimate	1971 actual	1972 estimate	1973 estimate
Program by activities:						
Direct:						
1. Fleet ballistic missile ships	360,094	391,528	779,400	340,327	408,100	766,100
2. Other warships	1,524,025	1,807,879	2,087,600	1,983,533	1,650,600	1,650,600
3. Amphibious ships	312,890	109,720	10,000	372,288	118,100	66,500
4. Mine warfare and patrol ships		5,100	251,900	46,483	87,700	190,100
5. Auxiliaries and craft	159,471	695,973	435,400	172,018	527,900	492,400
Total, direct	2,356,480	3,010,200	3,564,300	2,914,649	2,792,400	3,165,700
Reimbursable (total)	23,074	50,000	45,000	46,897	58,000	69,000
Total	2,379,554	3,060,200	3,609,300	2,961,546	2,850,400	3,234,700
Financing:						
Receipts and reimbursements from:						
Federal funds	−22,183			−11,801		
Trust funds	−878	−50,000	−45,000	−11,452	−50,000	−45,000
Nonfederal sources [1]	−13			−15		
Unobligated balance available, start of year:						
For completion of prior year budget plans				−2,429,353	−1,955,718	−2,165,518
Available to finance new budget plans	−21,494	−5,000		−21,494	−5,000	
Reprograming from (−) or to prior year budget plans	108,163					
Unobligated balance transferred from other accounts		−5,000			−5,000	
Unobligated balance transferred to other accounts		5,000			5,000	
Unobligated balance available, end of year:						
For completion of prior year budget plans				1,955,718	2,165,518	2,540,118
Available to finance subsequent year budget plans	5,000			5,000		
Budget authority	2,448,149	2,005,200	3,564,300	2,448,149	3,005,200	3,564,300
Budget authority:						
Appropriation	2,465,400	3,005,200	3,564,300	2,465,400	3,005,200	3,564,300
Transferred to other accounts	−17,251			−17,251		
Appropriation (adjusted)	2,448,149	3,005,200	3,564,300	2,448,149	3,005,200	3,564,300

[1] Reimbursements are derived principally from commercial carriers for property lost or damaged in transit (31 U.S.C 489A), and proceeds from the sale of personal property being replaced (40 U.S.C. 481C).

SUBCOMMITTEE PROCEDURE

Chairman ELLENDER. The principal witness this morning for this appropriation is Vice Adm. Jerome H. King, Jr., Deputy Chief of Naval Operations for Surface Warfare.

You may proceed.

Admiral KING. Thank you very much, Mr. Chairman.

I propose, with your permission, sir, to read my statement, copies of which have been provided.

Chairman ELLENDER. Thank you. You may proceed.

Admiral KING. Mr. Chairman, and members of the committee, I am Vice Adm. Jerome H. King, Jr., Deputy Chief of Naval Operations for Surface Warfare. I assumed this duty in July 1971. This is my first appearance before this committee.

I will present the Navy's shipbuilding and conversion program for fiscal year 1973.

INTRODUCTION OF ASSOCIATES

I am accompanied by Rear Admiral Sonenshein, Commander, Naval Ships System Command, Rear Admiral Moore, Director of Budgets and Reports, Office of the Navy Comptroller, Rear Admiral Price, Director of Ship Acquisition and Improvement Division, Opnav, Admiral Kaufman, Director, Strategic Submarine Division, and ULMS Program Coordinator, and Rear Admiral Linder, CVN Program Coordinator.

MISSIONS: STRATEGIC, SEA CONTROL, AND FORCE PROJECTION

It is the goal of the Navy to have sufficient forces to support our assigned responsibilities which include—in general terms—strategic, sea control, and force projection missions on a global basis. To do this effectively and at least cost in the long run, we require an effective, modern fleet. For the past few years, the need to modernize has been a matter of growing concern to the Navy, to the Secretary of Defense, and to this committee. We have made significant progress in certain areas. But I must report to you that despite the best efforts of all concerned, our overall position has declined in recent years relative to that of our major potential adversary.

FLEET MODERNIZATION

Since 1968 we have reduced the fleet by over 300 ships from 976 in fiscal 1968 to a planned 657 by the end of this fiscal year. These drastic measures have been taken so that we could focus our resources where they will do the most good. Even after retiring these older ships, one-third of our remaining ships will be over 25 years old. We must in-

crease our efforts toward fleet modernization to insure that this smaller Navy is a quality Navy—one that can get the jobs done; and one that can defeat any opposing forces if, when, and where challenges might arise. Any other course of action would signal to the world a conclusion that this Nation no longer aspires and intends to be No. 1.

SHIPBUILDING AND CONVERSION: ALLOCATION OF FUNDS

Over the past 20 years, an average of 11 percent of total Navy funds has been allocated for shipbuilding, and for conversion of existing ships, in the SCN Appropriation. But in the last 5 fiscal years (from 1968 through 1972) the allocation of funds for SCN has averaged just over 8½ percent. If strategic programs are subtracted, during the same 5-year period, there has been less than 7½ percent of overall Navy funding in the shipbuilding appropriation for general purpose forces. This has occurred at a time when unit prices have been rising due to increased demands of technology and the upward trend in all dollar costs.

CONVERSION OF SHIPS

Our fleet's advancing age and the costs in time and money to build modern ships present critical problems, with which this committee is familiar. But, a relatively new factor now faces us in relation to modernization of existing ships. In the past 10 years, about one-third of the ships involved in our shipbuilding and conversion programs have been conversions rather than new construction. In the past 5 years, including the POSEIDON conversions, this ratio has risen to over 40 percent. But after the next 2 years, our ship modernization program will virtually terminate the conversion effort since we will have run out of platforms which can be significantly modernized through conversion in a cost-effective way.

REPLACEMENT OF OVERAGED SHIPS

Our overaged ships are concentrated in the escort and support ship classes. Generally, support ship types do not lend themselves to modernization through conversion. At the end of fiscal year 1972, over 40 percent of underway replenishment ships and 80 percent of other support type ships will be over 25 years old. They are not suitable candidates for conversion. The combatant ships which we have been able to modernize by the conversion process have been between 17 and 15 years old at the time. Few ships of any type would be suitable for conversion past age 20. Thus, our present position and future needs call for a primary effort in replacing overaged ships with new ones, and to build forces up to the quantities required to meet commitments.

MODERNIZATION PROGRAMS

All of our analyses indicate the need for new programs to correct our problems of modernization. These programs must—where possible—be designed to acquire more ships at lower per unit cost. There is a limit to this approach and it cannot be applied profitably to certain ships, but each of our new proposals has been given intense examination as to cost versus quantity and effectiveness. This has led to certain important new shipbuilding initiatives begun last year and continued and expanded with this budget request. Examples of these new programs include the patrol frigate (PF), the sea control ship (SCS), and the missile equipped hydrofoil (PHM), all of which are included in this budget request. The first two appear for the first time. We also look forward to gaining widely expanded capabilities a few years hence from the surface effect ship development effort now underway.

CENTER FOR NAVAL ANALYSES

In developing characteristics for effective ships at low cost we have taken full advantage of past experience with previous ship types. We have analyzed and tested their performance and their limitations and this has guided our concepts and designs for the new ships. In this effort we have found the Navy's operations analysis organization, the operations evaluation group of the Center for Naval Analyses, most helpful. Their analyses of many fleet exercises, for example, has enabled them to give us good analytical support on such questions as: What is the best mix of weapons and sensors—at a fixed low cost—to put on a new ship with particular missions? Right now they are assisting with the current operational appraisal of the prototype of the sea control ship, which will have an important effect on the particular characteristics of this new type of ship.

STATUS OF THE FLEET

I will discuss each ship in the fiscal year 1973 program in more detail later. Before presenting these specifics, I would like to summarize the current status of the fleet. We plan to have about 657 ships in the active fleet by the end of fiscal year 1972, the current fiscal year. This compares to 976 ships at the end of fiscal year 1968 and 702 ships at the end of fiscal year 1971. The major components of the fiscal year 1972 and 1973 planned forces are shown on this chart.

Now it is displayed on the screen, Mr. Chairman.

END FISCAL YEAR

MAJOR COMPONENTS OF PROJECTED ACTIVE FLEET

	FY 1972	FY 1973
FBM SUBMARINES	41	41
ATTACK AIRCRAFT CARRIERS	14	14
ASW AIRCRAFT CARRIERS	3	2
ATTACK SUBMARINES	94	87
MAJOR SURFACE COMBATANTS	158	138
OCEAN ESCORTS AND PATROL	84	85
AMPHIBIOUS WARFARE SHIPS	78	66
MINE WARFARE SHIPS	32	10
UNDERWAY REPLENISHMENT SHIPS	60	61
AUXILIARIES & MISCELLANEOUS SHIPS	93	90
TOTAL	657	594

SHIPS TURNED OVER TO SOUTH VIETNAM

Chairman ELLENDER. Admiral, what type of ships have we transferred to the South Vietnamese?

Admiral KING. We have turned over to the South Vietnamese Navy, Mr. Chairman, two ships of the destroyer escort variety and two PCE's, which are even smaller patrol craft, and we have also given them, for their blue water fleet, some Coast Guard cutters which were obtained from the U.S. Coast Guard.

In addition, we have turned over to the South Vietnamese Navy a number of craft which I would like to precisely define for the record, but over 900 small craft. These are such things as armored troop carriers, LCM conversions into monitors, patrol craft, and so on. All of these are very small craft, not ships, and are suitable largely for inland waterway type of use only.

Chairman ELLENDER. Please provide for the record a listing of the ships, by types, that have been transferred to South Vietnam during fiscal years 1970, 1971, and 1972 to date. I am not talking about the 900 small craft, just the major ships.

Admiral KING. I will provide that information for the record, Mr. Chairman.

(The information follows:)

In the USN portion of Vietnamization over 900 ships and craft have been turned over to the Vietnamese Navy. The majority of these units are small craft for coastal and river patrol and logistics lift in the many inland waterways of the Republic of Vietnam. No major units were transferred during the FY 68–69 period; in the FY 70–72 period 13 major or "blue water" units were turned over. A tabulation of these transfers by type and year is provided below.

	Number turned over
Fiscal year 1970:	
Landing ship tank (LST)	3
Patrol craft escort (PCE)	1
Fiscal year 1971:	
Radar picket escort destroyer (DER)	1
High endurance cutter[1] (HEC)	2
Patrol craft tender (AGP)	2
Fiscal year 1972:	
Radar picket escort destroyer (DER)	1
High endurance cutter[1] (HEC)	2
Landing craft repair ship (ARL)	1

[1] Former U.S. Coast Guard ships.

PLANNED MAJOR FLEET COMPONENTS

Chairman ELLENDER. Proceed.

Admiral KING. At the end of fiscal year 1972, the major fleet components are planned to be: 41 fleet ballistic missile submarines all of which are nuclear powered; 14 attack aircraft carriers, one of which has nuclear propulsion and one of which is evaluating the aircraft carrier CV configuration.

AIRCRAFT CARRIER CONSTRUCTION

NUCLEAR ATTACK

Chairman ELLENDER. You have two large carriers under construction at this time.

Admiral KING. That is correct, sir.

Chairman ELLENDER. They are not counted?

Admiral KING. They are not. The summary I am providing here is the actual active fleet, in commission.

Chairman ELLENDER. When will these carriers join the fleet?

Admiral KING. We have two new nuclear propelled attack carriers under construction, which are the *Nimitz* and *Eisenhower*. The first the *Nimitz*, will be joining the fleet in 1973, and the second, the *Eisenhower*, will be joining the fleet in 1975.

Chairman ELLENDER. All right, proceed.

FLEET COMPONENTS

Admiral KING. Three antisubmarine aircraft carriers, one of which is in such condition that for the last few months of the fiscal year it will not be operable.

Ninety-four attack submarines, 57 of which have nuclear propulsion;

One hundred fifty-eight surface combatants composed of cruisers, frigates, and destroyers. Three of these are nuclear powered and 65 are equipped with guided missiles;

Eighty-four ocean escort and patrol ships of which six are equipped with antiair missiles;

Seventy-eight amphibious warfare ships including one gun cruiser;

Thirty-two mine warfare ships;

Sixty underway replenishment ships;

Ninety-three auxiliary and miscellaneous ships;

Six hundred fifty-seven total.

You will also see, as is shown on the slide, that our projection for end fiscal year 1973 is for 594 ships, the lowest figure since World War II. The major reductions between fiscal year 1972 and 1973 involve eight nonnuclear submarines, 20 major surface combatants, 10 amphibious warfare ships, an antisubmarine carrier, the CVS, and 22 mine warfare ships. I should also point out that the 138 remaining major surface combatants in fiscal year 1973, we will have added only one nuclear powered surface ship since the nuclear guided missile frigate *Truxton*—authorized in fiscal 1962—was commissioned in 1967. There will be no increase in the number of other guided missile ships since fiscal year 1968 although the number in the active fleet has varied slightly because of losses and subsequent gains as some of them were converted and modernized.

SHIPBUILDING PROGRAM

Our shipbuilding program for fiscal year 1973 requests a total of $3,564,300,000 for the construction of 20 new ships including: Six nuclear attack submarines (SSN); seven destroyers (DD–963 class); one patrol frigate (PF); two patrol hydrofoils, guided missile (PMH); one destroyer tender (AD); one submarine tender (AS); two rescue and salvage ships (ATS).

A total of 20 ships including 16 combatants and four support ships.

Also included is the request for nine conversions of the following types: Six Poseidon fleet ballistic missile submarines (SSBN); two guided missile frigate AAW modernizations (DLG); one fleet ballistic missile submarine tender (AS–FBM).

For a total of nine ships including six strategic submarines, two combatants, and one support ship.

DATA SHEETS

We have provided each of you with data sheets which give the significant facts on each ship for which authorization and funding is being requested.

BUDGET REQUEST: NEW SHIPS AND CONVERSIONS

As I discuss each ship we will display a simplified version of the data sheet for your convenience.

With your permission, I will cover each of the ship types in turn—in order of budget activity. The total obligational authority (TOA) for 20 new ships is $2,788,800,000 and for nine conversions $547.9 million.

POLARIS-TO-POSEIDON CONVERSION PROGRAM

Chairman ELLENDER. The first request is for the conversion of six Polaris submarines to the Poseidon configuration at a total estimated cost of $452.7 million. The ship data sheet will be included in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE SHIP DATA SHEET

Service: Navy—Nomenclature: (Submarine FBM) P–1 LINE ITEM: 1, 2, 5 and 6; POPULAR NAME: POSEIDON Submarine.

Mission/Description.—A flexible sea-based Fleet Ballistic Missile Weapon System to provide a highly invulnerable offensive weapon as a primary deterrent to enemy initiation of surprise nuclear attack, capable of inevitable retaliation against specified targets. The SSBN is a nuclear powered submarine equipped for computing accurate positional and geo-ballistic data and for launching 16 POSEIDON missiles.

COST DATA

[Dollars in millions]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate, total program
Quantity	8	6	6	6	5	0	0	0	0	31
Ship cost	$500.9	$399.2	$358.0	$452.7	$376.6	0	0	0	0	$2,087.4
Less advance procurement	105.1	133.4	117.8	169.7	122.6	0	0	0	0	648.7
Net current year program	395.8	265.8	240.2	283.0	254.0	0	0	0	0	1,438.8
Advance procurement current year	317.7	83.8	136.3	111.0	0	0	0	0	0	648.7
Weapons systems cost	713.4	349.5	376.5	394.0	254.0	0	0	0	0	2,087.4
Outfitting/post delivery	4.6	9.9	6.2	10.0	6.1	$6.3	$3.2	0	0	46.3
R.D.T. & E	300.7	18.0	1.3	0	0	0			0	320.0
Milcon	0	0	0	0	0	0	0	0	0	0
Program acquisition cost [1]	1,018.7	377.4	384.0	404.0	260.1	6.3	3.2	0	0	2,453.7
Average unit cost										79.2

[1] Includes SSBN overhaul costs which are reflected in the total additional cost section of the SAR

Basis for Fiscal Year 1973 Request

A program objective of 31 SSBN conversions has been approved by the Secretary of Defense and presented and justified to the Congress as necessary to sustain POSEIDON's assigned destruction task in the strategic deterrent force. The schedule for conversions was developed giving paramount consideration to the following factors:

(1) Minimum SSBN time offline.

(2) Maintenance of effective operational force levels during conversion periods.

(3) Direct interrelation of conversion effort and overhaul requirements.

(4) Maximum utilization of core life.

(5) Shipyard capacity.

(6) Coordination of shipyard efforts.

While playing maximum emphasis on meeting the POSEIDON objectives, schedules are designed to prevent the deployed FBM force levels from falling below the objectives established to maintain an effective deterrent capability. Twenty SSBNs have been authorized for conversion. The increment of six requested in fiscal year 1973 is a part of the buildup to maintain the posture. If the six are not approved, the prescribed force level objective will not be met and the planned deterrent capability cannot be maintained. Additionally, the six ships will have to be overhauled because of nuclear core depletion, and subsequently returned, when shipyard loading permits, for conversion.

Product quality of the POSEIDON weapon system would also be jeopardized because repetitive production of weapon system components which are not in production for any other program or purpose, could not be maintained.

Test Data: Not applicable.

Contract data—Conversion yards

	Program year
Electric Boat Division, General Dynamics Corp., Groton, Conn.	
SSBN:	
627—CPIF	1968
632—CPIF	1969
633—CPIF	1970
634—CPIF	1971
640—CPFF	1971
642—CPFF	1972
656—CPFF	1972
Newport News Shipbuilding & Drydock Co., Newport News, Va.	
SSBN:	
628—CPIF	1970
629—CPIF	1968
636—CPIF	1971
641—CPIF	1971
645—CPFF	1972
655—CPFF	1972
Mare Island Naval Shipyard	
SSBN 630—Project Order	1969
Puget Sound Naval Shipyard, Bremerton, Wash.	
SSBN:	
631—Project Order	1970
644—Project Order	1971
654—Project Order	1972
657—Project Order	1972
Portsmouth Naval Shipyard, Portsmouth, N.H.	
SSBN:	
635—Project Order	1970
643—Project Order	1971

MAJOR SUBSYSTEMS—FBM WEAPON SYSTEM

	Class	SSBN-627 (J. Madison)
Characteristics:		
Displacement surface/submarine	U	7337/8250 T.
Length OA/beam extension	U	425/33 feet.
Draft maximum navigation	C	[Deleted.]
Speed maximum surface submarine	C	[Deleted.]
End submarine at maximum speed	CRD	[Deleted.]
Operating depth	C	— feet [2]
Shaft HP/number screws	C	[Deleted.] [1]
Missiles number	U	16.
Missile fire control system	U	MK-88.
Torpedo tubes	U	4.
Torpedo fire control system	U	MK-113.

[1] Current.
[2] Subject to submarine safety program certification.

INVENTORY DATA

	End fiscal year 1971	Fiscal year 1972	Fiscal year 1973
Polaris configurations (SSBN's):			
Deployed	24	[Deleted.]	
Overhaul—predeployment	3		
Total, Polaris	27		
Poseidon configurations (SSBN's):			
Deployed	3		
Convert—predeployment	11		
Total	14		
Total, SSBN's	41	41	41

COST HISTORY COMPARISON

	Procurement	R.D.T. & E.	Milcon	Total
Baseline estimate	[1] 2,241.5	278.0		2,519.5
Total program cost:				
(Fiscal year 1972 budget submission	[1] 2,276.0	320.0		2,596.0
Fiscal 1973 budget submission	[1] 2,133.7	320.0		2,453.7

[1] Includes cost of overhauls which are reflected in the additional costs section of the selected acquisition report

Note: Reduction due to cost adjustments based upon prior year experience.

Admiral KING. In continuation of the Polaris program which began with fiscal year 1968, we are requesting an increment of six conversions this year. Twenty ship conversions have been authorized previously in our planned program to convert 31 of the 41 Polaris submarines to the Poseidon missile configuration.

Our Poseidon conversion program has been most successful in meeting schedules and remaining within our cost estimates.

The six conversions in this year's program are estimated to cost $452.7 million. The TOA requested is $283 million.

COST OF POLARIS-TO-POSEIDON CONVERSION PROGRAM

Chairman ELLENDER. Through fiscal year 1972 approximately $1.4 billion has been provided for the conversion of 20 Polaris submarines to the Poseidon configuration. As I understand the data sheet this is only the cost of conversion of the submarines, and does not include the cost of the missiles, or any R. & D. costs. Am I correct about this?

Admiral KING. That is correct, Mr. Chairman.

Chairman ELLENDER. A better measure of the total cost of this conversion program would be the estimate of $2.5 billion for the conversion of the 31 submarines plus $3.4 billion for the cost of the Poseidon missiles for a total of $5.9 billion. When this total is prorated among the planned 31 conversions we have a total of approximately $190 million per conversion. Admiral, do you agree with the figures?

Admiral KING. Mr. Chairman, I think those figures are correct. I would like to have an opportunity to review the matter and provide a detailed statement on the conversion program for the record.

Chairman ELLENDER. I wish you would. I would like to have a statement on the total program.

Admiral KING. Yes, sir.

(The information follows:)

POLARIS-TO-POSEIDON CONVERSION PROGRAM

As reported in the Congressional Data Sheets in support of the Fiscal Year 1973 budget for the POSEIDON missile and the SSBN POSEIDON conversions, the following compilation is obtained:

31 SSBN conversion and associated R.D.T. & E.	2453.7
4 submarine tender conversions	85.5
[Deleted] POSEIDON missiles and associated R.D.T. & E.[1]	3434.0
Total	5973.2

[1] The missile quantity does not include 21 missiles funded in RDT&E.

Dividing the combined total obtained above by 31, it is possible to derive an average cost per SSBN conversion, including the POSEIDON missiles, of 192.7 million. This figure somewhat overstates the true cost of the POSEIDON program since it includes approximately 1.2 billion in concurrent submarine and tender overhaul costs which would have been required even if there were no POSEIDON program. A more representative total cost, as reported to the Congress in the Selected Acquisition Report, is 4,786.0 million or an average unit cost of 154.4 million for each of 31 units.

FINANCING SSBN PROGRAM

Chairman ELLENDER. Let me be sure that I understand your request. As you indicated, these six conversions are estimated to cost $452.7 million, which is offset by advance procurement provided in prior fiscal years in the amount of $169.7 million, leaving a net requirement of $283 million for these six submarines. And in addition, you are requesting $111 million for advance procurement to support the planned fiscal year 1974 conversion program. Have I stated this correctly?

Admiral KING. Yes, sir; that is correct.

Senator YOUNG. I note on the ship data sheet an additional $10 million for "outfitting/post delivery." Is this included in the $10.1 million set out on lines numbered 5 and 6 of the P–1 exhibit?

Admiral KING. Yes, sir; it is included.

Chairman ELLENDER. Please provide a detailed statement for the record on this $10 million, and indicate the fiscal years in which these ships were originally funded for conversion.

Admiral KING. I will be happy to do so.

(The information follows:)

The outfitting and post delivery request includes $4,867,000 for SSBN outfitting requirements and $5,056,000 for post delivery requirements.

Estimates for initial outfitting will provide funding for procurement of ship repair parts and other material, such as general use consumables, required to replenish the ship's initial allowance of storeroom and operating space items based on changes occurring as a result of conversion and concurrent overhaul. SCN funding for the initial fill of allowance-list material will be limited to those items that are on the consolidated ships allowance list (COSAL) which is in effect four months after the completion of fitting out and for which obligations can be incurred prior to deployment. The "Initial allowances" include replacement of items consumed in test and checkout.

The post delivery effort funds all work, including related design, planning and government furnished material procurement, required for correction of ship

deficiencies identified during Underway Trials/Material Inspection (UT/MI) conducted prior to completion of conversion. The work will be accomplished during a four-week post shakedown availability (PSA) period between Demonstration and Shakedown Operations (DASO) and deployment. Material is budgeted for correction of deficiencies only if delivery and installation can be accomplished before the scheduled deployment. By direction, the total post delivery requirement for each ship is budgeted in the fiscal year of first need.

The fiscal year 1973 outfitting and post-delivery estimates by ship are as follows:

SCN OUTFITTING AND POSTDELIVERY COSTS—FISCAL YEAR 1973

[Thousands of dollars]

Ship	Program year	Outfitting cost	Postdelivery costs
SSBN 643	1971	234	632
SSBN 644	1971	234	632
SSBN 642	1971	339	632
SSBN 645	1972	339	632
SSBN 654	1972	474	632
SSBN 655	1972	712	632
SSBN 656	1972	699	632
SSBN 657	1972	673	632
SSBN 658	1973	424	----
SSBN 659	1973	424	----
SSBN 616	1973	105	----
SSBN 617	1973	105	----
SSBN 619	1973	105	----
Total		4,867	5,056

CONVERSION PROGRAM COST

Chairman ELLENDER. As I read the ship data sheet on this conversion program, you expect to ask for the funding for the conversion of the last five of the 31 submarines to be converted in fiscal year 1974. Am I correct about this?

Admiral KING. Yes, sir; that is correct.

Senator YOUNG. On page 5 of the ship data sheet, I note that the "baseline estimate total program" cost for this conversion program was $2,519.5 million. What was the date of this estimate?

Admiral KING. The baseline estimate shown in the ship data sheet equates to the development estimate of November 10, 1966 which is reflected in the selected acquisition report.

Senator YOUNG. You are now estimating the total estimated cost of this program at $2,453.7 million, which includes the $320 million for R. & D. associated with this program. Is this current estimate comparable to the baseline estimate of $2,519.5 million?

Admiral KING. Yes, sir; the two estimates are comparable.

FLEET BALLISTICS MISSILE SUBMARINE TENDER (AS–FBM)

Chairman ELLENDER. If there are no further questions on the Poseidon conversion program, we will proceed with the consideration of the request for the conversion of a fleet ballistic missile submarine tender, which is estimated to cost $22.4 million. The ship data sheet will be included in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

Service: Navy—Nomenclature: (Tender, Submarine, FBM) P–1 Line Item: 3, 4, 5, and 6; Popular Name: POLARIS/POSEIDON Tender

Mission/Description.—To provide mobile base facilities and support for deployed SSBNs. AS(FBM)s are capable of performing a high level of maintenance and repair on SSBNs and of providing them complete logistic support. Locating AS(FBM) near SSBN patrol area increases SSBN time on station.

COST DATA

[Dollar amounts in millions]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate, total program
Quantity	2	0	0	1	[Deleted]			0	0	4
Ship cost	$39.0	0	0	$22.4				0	0	$84.4
Less advance procurement	0	0	0	8.4				0	0	18.3
Net calendar year program	39.0	0	0	14.0				0	0	66.1
Advance procurement calendar year	0	$0.1	$8.3	.3				0	0	18.3
Weapons systems cost	39.0	.1	8.3	14.3				0	0	84.4
Outfitting/post delivery	.1	.3	0	.1				0	0	1.1
R.D.T. & E	0	0	0	0				0	0	0
Milcon	0	0	0	0				0	0	0
Program acquisition Cost [1]	39.1	.4	8.3	14.4				0	0	85.5
Average unit cost										21.4

[1] Includes tender overhaul costs which are reflected in the additional cost section of the SAR.

Note: Dollars may not add due to rounding.

Basis for fiscal year 1973 Request:
Four tenders must be converted to support SSBNs with POSEIDON capability. Two tenders were authorized for C–3 conversions in prior years. Of the remaining two, one is scheduled to enter the shipyard in FY 1973 and one is planned for conversions in [deleted]. The scheduled tender conversions are programmed to support deployed POSEIDON submarines.
Test Data: Not applicable.

CONTRACT DATA

Ship Conversion	Puget Sound Naval Shipyard, Bremerton, Wash	Project order.

	Class	AS–31 (Hunley)
Characteristics:		
Displacement, full load	U	19,000 tons.
Length OA/beam	U	600/85 ft.
Draft, maximum navigation	U	25 ft.
Speed, sustained	U	18.0 knots.
Shaft horsepower/number screws	U	15,000/1.
Missile capacity	U	16.
Torpedo stowage	U	172.
Armament, mounts	U	2/3 inch 50 twin.

INVENTORY DATA

	End fiscal year 1971	Fiscal year 1972	Fiscal year 1973
Total operational FBM tenders	5	5	5
Converted to Poseidon	2	2	2
Under conversion to Poseidon			1
Polaris	3	3	2

Cost history comparison

Initial planning estimate (development estimate):	
Procurement	[1] 76.3
R.D.T. & E	0
MILCON	0
Total program costs	76.3
Current estimate total program (fiscal year 1972 budget submission):	
Procurement	[1] 89.7
R.D.T. & E	0
MILCON	0
Total program costs	89.7
Current estimate total program (fiscal year 1973 budget submission):	
Procurement	[1] 85.5
R.D.T. & E	0
MILCON	0
Total program costs	85.5

[1] Includes tender overhaul costs which are reflected in the additional cost section of the SAR.

Reduction due to cost adjustments based upon prior year experience.

Admiral KING. To provide the special support and repair capacity necessary to maintain our deployed fleet ballistic missile submarines we need sufficient tenders configured to service the increasing number of Poseidon ships. This conversion will upgrade and modify an existing

Polaris support submarine tender to the Poseidon support role. Our estimate for this conversion is $22.4 million. Total obligational authority requested is $14 million.

AGE OF SHIP DETERMINATION

Chairman ELLENDER. When you complete the conversion of the Poseidon, how will they be classified as to age? Will the age be determined from the time the hull was constructed or do you give allowance for the conversion?

Admiral KING. Mr. Chairman, the age of the ship is and must remain calculated from the original commissioning date—because of the hull structure and extensive machinery installations which simply cannot be totally modernized at the time we provide the Poseidon capabilities for these ships. The basic hull structure and machinery remain generally intact even though they are overhauled incident to the conversion process. But the calculation of the age remains as of the date of the original commissioning, sir.

FINANCING OF TENDER PROGRAM

Chairman ELLENDER. You only need $14 million in new funds because the Congress has provided $8.4 million advance procurement in prior fiscal years. Am I correct about this?

Admiral KING. Yes, sir; that is correct. Of the $22,355,000 cost, $8,330,000 was provided in advance procurement in prior fiscal years.

Senator YOUNG. As I understand the data sheet, you are going to have to convert four tenders in order to be able to support the 31 Poseidon submarines, and two of these have already been funded. Am I correct?

Admiral KING. Yes, sir; that is correct. The 31 Poseidon submarines will operate from three separate refit sites. In order to keep a submarine tender at each site and provide for routine overhauls a total of four tenders is required.

Senator YOUNG. I note that your request includes $339,000 for advance procurement for the conversion of the fourth tender. When do you expect to ask for full funding for the conversion of this fourth ship?

Admiral KING. We expect to request full funding for the conversion of the final Poseidon submarine tender in fiscal year [deleted].

Chairman ELLENDER. Have the two ships for which funds for conversion were provided in prior years rejoined the fleet?

Admiral KING. Yes, sir; both the U.S.S. *Simon Lake* (AS 33) and the U.S.S. *Canopus* (AS 34) have rejoined the fleet following their conversion.

Chairman ELLENDER. When would you expect this particular ship to rejoin the fleet?

Admiral KING. We expect the U.S.S. *Holland* (AS 31) to complete conversion in December 1973 and to deploy in [deleted] following a shakedown period.

FINANCING ADVANCE PROCUREMENT OF CONVERSION PROGRAM

Chairman ELLENDER. With reference to the $111 million you are requesting for advance procurement to support the planned fiscal year 1974 conversion program of the last five submarines, it seems that you have an additional $11.6 million for this purpose from prior fiscal years to give a total advance procurement to support the fiscal year 1974 program of $122.6 million. Is this correct?

Admiral KING. Yes sir; that is correct. There will be a total of $122.6 million in advance procurement to support the fiscal year 1974 program.

NUCLEAR ATTACK SUBMARINES

The next request is for the construction of six nuclear attack submarines at an estimated cost of $1,050 million. The ship data sheet will be included in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

Service: Navy.—*Nomenclature:* (High speed nuclear attack submarine) P1 line item: 10; Popular name: *Los Angeles* (*SSN 688*)

Mission/Description: To destroy enemy ships, primarily submarines, in order to prohibit the employment of such forces in attack and destruction of United States or allied targets.

COST DATA

[Dollars in millions]

	Fiscal year—								Cost to complete	Current estimate, total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Quantity	3	4	5	6						[Deleted.]
Ship cost	$536.0	$664.0	$877.5	$1,050.0						$6,877.5
Less advance procurement	−35.0	−69.1	−110.0	−136.0						
Net current year program	501.0	594.9	767.5	914.0	[Deleted]					
Advance procurement, current year	146.6	67.5	136.0	125.0						
Weapon systems cost	647.6	662.4	903.5	1,039.0						6,877.5
Outfitting/post delivery				3.2						197.6
R.D.T. & E										None
Milcon										None
Program acquisition cost										7,075.1
Average unit cost										[Deleted]
Total additional cost										None

Basis for Fiscal Year 1973 Request:

Conversion of our attack submarine force to an all nuclear force as rapidly as resources will allow is a vital and urgent goal. Navy objective has been a force of about [deleted] first line nuclear attack submarines. These ships are the only weapons system capable of operating for long periods of time in waters under enemy air and surface control. The SSN–688 class submarine will [deleted] provide improved sensor and weapons systems and provide requirements for future modifications.

Rapid progress in the building of Soviet submarine forces has resulted in total number of Soviet nuclear submarines now exceeding U.S. nuclear submarine force levels. In addition, Soviet SSBN force levels are expected to exceed U.S. SSBN levels in 1973, a year earlier than previously anticipated. [Deleted.]

In FY 70, 71 and 72 Congress authorized construction of a lead and eleven follow-on ships. In addition, the FY 72 appropriations provided advance procurement funding which would permit construction of six FY 73 ships. Multi-year, multi-ships contracts for 12 ships have been signed with Newport News Shipbuilding and Drydock Company and Electric Boat Division of General Dynamics.

Test Data:

Equipment and projected service approval data

AN/PRC ( )	Presently Space & Weight only
AN/BRN ( )	Presently Space & Weight only
AN/BQS–13 DNA	Late CY 1975
AN/BQS–15	Late CY 1975
AN/WLR–8(V)2	Mid CY 1972
AN/UYK–7	Mid CY 1973
Type 18 Periscope	Mid CY 1972
AN/BRN–6	Late CY 1972

Contract Data:

Basic Construction.—Newport News Shipbuilding and Drydock Co., Newport News, Virginia (FPI) Electric Boat Division of General Dynamics Corp., Groton, Connecticut (FPI).

Major Subsystems.—Propulsion, Electric Power Generation and Distribution, Ship Control.

Combat Systems.—Fire Control, Weapons/Launchers, Command and Control Sensors.

	Class	Item, model, series, class, etc
(1)		
Characteristics:		SSN–688 class:
Display full load	U	6900 tons.
Length OA/Beam extention	U	360'/33'.
Draft, maximum navigation	U	32'.
Speed	C	[Deleted] knots.
Shaft horsepower/number screw	C	[Deleted] horsepower/1.
Radars	U	BPS–15.
	U	BQS–13 (DNA).
Sonars		BQS–15 (—).
Other Ordnance	C	[Deleted] torpedo tubes.

Inventory Data.—The following table based on past procurement decisions, the current Five Year Defense Plan, and a construction rate of 6 in FY 73 with [deleted] SSNs per year commencing in FY 74, displays U.S. attack submarine force levels.

	Fiscal year—							
	1972	1973	1974	1975	1976	1977	1978	1979
SSN	57	[Deleted]						
SS	37							
Total United States	94							

Reflects current program, a reduction from fiscal year 1971 planned force of [deleted] attack submarines ‡

PRODUCTION DATA—DELIVERIES

	Fiscal year—							
	1971 and prior	1972	1973	1974	1975	1976	1977	Beyond 1977
R. & D. test items								
Procurement:								
Fiscal year 1970 and prior	[Deleted.]							
Fiscal year 1971		[Deleted.]						
Fiscal year 1972			[Deleted.]					
Fiscal year 1973								[Deleted.]
Fiscal year 1974								
Fiscal year 1975								
Fiscal year 1976								
Fiscal year 1977								
Balance								

Cost history comparison	Quantity	Millions of dollars
Initial planning estimate (development estimate):		
Procurement	[Deleted]	5,747.5
R.D.T. & E.		0
Milcon.		0
Total program costs		5,747.5
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	[Deleted]	5,747.5
R.D.T. & E.		0
Milcon.		0
Total program costs		5,747.5
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	[Deleted]	7,075.1
R.D.T. & E.		0
Milcon.		0

The dollar difference between fiscal year 1973 and fiscal year 1972 is due to: (1) quantity change adding [deleted] ships to the program and (2) economic change due to repricing ship acquisition costs from fiscal year 1972 dollars to fiscal year 1973 through fiscal year 1977 dollars.

SIX NUCLEAR ATTACK SUBMARINES (SSN–688 CLASS)

Admiral KING. These are follow-on attack submarines of the high speed SSN–688 class. The fiscal year 1972 program included five of these submarines with advance funding to support five ships this year. To this, Congress added funds for a sixth set of long leadtime items which enables us to request six attack submarines this year.

Chairman ELLENDER. Is the cost in line witih your estimates?

Admiral KING. Yes, indeed, Mr. Chairman. At this time, the cost of these ships is tracking with our estimates. The cost estimate for the six attack submarines is $1.5 billion. The total obligational authority request for these and certain aspects of the future submarine program is $1.39 billion.

FUNDING FOR NUCLEAR ATTACK SUBMARINES

Chairman ELLENDER. I want to be sure that I understand your request for these submarines. As indicated earlier, the estimated cost of these six submarines is $1,050 million, which is offset by $136 million advance procurement provided in prior years, giving a net requirement for these six submarines of $914 million. And in addition, you are requesting $125 million for advance procurement to support

the construction of these submarines in later years, making the total requirement of $1,039 million. Have I stated this request correctly?

Admiral KING. That is correct, sir.

Chairman ELLENDER. As I read the data sheet, the request for $125 million advance procurement to support the construction of these submarines in fiscal year 1974 is based on the full funding of [deleted] of these submarines in 1974. Am I correct about this?

Admiral KING. You are correct, sir.

Senator YOUNG. Earlier, you referred to the fact that the Congress had increased the fiscal year 1972 advance procurement program in order to provide for the construction of six of these submarines in fiscal year 1973. [Deleted.]

Admiral KING. The request for funding for six SSN–688 class submarines in the fiscal year 1973 budget reflects both our desire to augment our submarine force by the addition of these urgently required ships and our response to the expression of Congress in their firm support of this program through providing additional funding. [Deleted.]

Chairman ELLENDER. Through fiscal year 1972, about $2.1 billion has been provided for the construction of 12 of these new high speed submarines. When do you expect these 12 submarines to join the fleet?

Admiral KING. The first of the SSN–688 class submarines, the U.S.S. *Los Angeles*, SSN–688, will join the fleet in [deleted].

Chairman ELLENDER. You indicated that the current cost of these submarines is in line with your original estimates. With respect to your two contracts for the construction of the first 12 of these submarines, it is my understanding that that contract is in the nature of a fixed priced incentive contract. Am I correct about this?

Admiral KING. That is correct, sir.

Chairman ELLENDER. At this date, do you have any reason to believe that these 12 submarines cannot be completed with the approximately $2.1 billion that has been provided for their construction?

Admiral KING. I have no reason at this time to believe that these submarines will not be delivered on schedule and within cost.

SSN–665 GUITARRO

Senator YOUNG. The fiscal year 1965 shipbuilding program included about $75 million for the construction of a nuclear attack submarine designated SSN–665—the *Guitarro*. While under construction at the Mare Island Naval Shipyard, this submarine sank on May 15, 1969. What is the current status of this submarine, and could you give us an estimate of the additional cost resulting from this accident?

Admiral KING. *Guitarro* is being completed at the Mare Island Naval Shipyard and is presently scheduled to be commissioned in June of this year. The additional cost resulting from the accident is estimated to be $33 million.

DD–963 DESTROYERS

Chairman ELLENDER. The next request is for $610 million for the construction of seven DD–963 destroyers. This ship data sheet will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

Service; Navy—Nomenclature: (Destroyer); P1 Line Item: 15; Popular Name: SPRUANCE (DD963) Class

Mission/description.—To operate offensively in the presence of an air, surface or subsurface threat with strike, anti-submarine or amphibious forces; and to provide protection to these forces, underway replenishment groups and military or mercantile convoys against surface or subsurface threats; and to provide gunfire support to amphibious assaults or land campaigns.

Basis for FY 1973 Request.—The DD–963 Program is intended to replace, on a less than one-for-one ratio, the rapidly aging naval surface warfare capability previously provided by our over-aged WWII destroyers. Our most recent projections show a future need for a minimum of about [deleted] escorts of various types. We currently have some [deleted] built or building, that can fill this need. The DD963 Program (30 ships) raises this to [deleted]. Thus we have a serious present and projected deficit, even with the DD–963 Program. Congress has already approved sixteen DD–963s and the seven requested in the FY 73 budget fulfill contract obligations and satisfy the primary need to make this badly needed naval surface warfare capability available to the Fleet as soon as possible.

Test Data:

1. MK 86 GFCS—Projected date of service approval—Sep 1972
2. MK 116 Computer Program—The major milestones associated with development of the Computer Program are:
   a. Load into Combat Shore Systems Test, begin debugging—October 1973.
   b. Deliver Operational Program to First Ship—April 1974.
3. T—701 H. F. Exciter; R—701 H. F. Receiver.
   a. These items are based on equipment previously in the Army inventory. They are being repackaged, modified and tested by the Contractor to demonstrate their suitability for shipboard application.
   b. Performance will be demonstrated during the ship pre-delivery testing. After delivery, service experience will be obtained during mission demonstrations and the operational appraisal of the first ship (DD963). The data from these tests will form the basis for service approval recommendations.
4. Propulsion System. The major milestones associated with testing the propulsion system are listed below:

   Propulsion one-half ship set:
   Complete system and Test Facility Design—February 1972.
   Commence System Test Operation—October 1973.
   Accumulate 100 hours of test—July 1974.

Contract Data:

Basic Construction.—Litton Systems, Inc., The Ingalls Shipbuilding Division, Ingalls West Division, Pascagoula, Miss.; Fixed Price Incentive Successive Target (multi-year basis).

Major Subsystems.—LM–2500 Gas Turbines (General Electric; Command and Decision Subsystem (AN/UYK–7 Digital Computer)—(UNIVAC) AN/UYA–4 (V) Data Display Group (Hughes Aircraft).

COST DATA

[Dollars in millions]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate, total program
Quantity	3	6	7	7	7					30
Ship cost	$304.1	$506.8	$599.2	$610.0	$614.4					$2,634.5
Less advanced procurement	−19.4	−25.9								−45.3
Net calendar year program	284.7	480.9	599.2	610.0	614.4					2,589.2
Advanced procurement calendar year	45.3									45.3
Weapons systems cost	330.0	480.9	599.2	610.0	614.4					2,634.5
Outfitting/post delivery				2.1	5.1	$8.5	$10.5	$14.2	$5.4	45.8
R.D.T. & E.	37.6									37.6
Milcon										2,717.9
Program acquisition cost										90.6
Average unit cost										
Total additional cost										

Characteristics	Class	Item, model, series, class, etc.
Disp. full load	U	7,600 tons.
Length overall/beam ext	U	563 ft./55 ft.
Navigational draft	U	29 ft.
Speed	U	30 knots.
Shaft horsepower/number screws	U	80,000/2 screws.
Radars	U	AN/SPS 55 surface search.
	U	AN/SPS 40B air search.
Sonars	U	AN/SQS-26DX.
Guns	U	5 inch/54 LWG MK 45.
Other ordnance	U	UFCS MK 116.
	U	ASROC MK 16.
	U	BPDSMS launching system MK 115 and MK 26.
	U	Torpedo tube MK 32.
	U	GFCS MK 86.
	U	Sparrow III missiles.
Aviation	U	Full helo facility, including hangar.

Inventory Data.—The DD–963 Class will phase into the Fleet beginning with the first ship delivery scheduled in FY 1975 and reach a level of 30 in late FY 1978 with the delivery of the last ship under the current DOD approved program.

COST HISTORY COMPARISON

	Quantity	Dollars (millions)
Initial planning estimate (development estimate):		
Procurement	30	2,545.2
R.D.T. & E		36.0
Milcon		
Total program	30	2,581.2
Current estimate total program:		
Fiscal year 1972 budget submission:		
Procurement	30	2,681.7
R.D.T. & E		36.1
Milcon		
Total program	30	2,717.8
Fiscal year 1973 budget submission:		
Procurement	30	2,680.3
R.D.T. & E		37.6
Milcon		
Total program	30	2,717.9

The differences in procurement costs between the FY 1972 and FY 1973 submissions are due to support changes (increases in outfitting costs going from bit and piece repair to modular replacement spares for the MK 86 GFCS), estimating changes (minor reductions in program support costs identified in the SAR as "Other Costs"), and schedule changes (increases to cover the extended contract definition period).

The difference in RDT&E costs between the FY 1972 and the FY 1973 submissions are due to final payments of contract definition costs which resulted from the extended contract definition period. Procurement costs were reduced by a like amount to compensate for these costs.

SEVEN DESTROYERS (DD–963 CLASS)

Admiral KING. This is a continuation of the DD–963 program which was initially funded in fiscal year 1970. A multiyear contract was awarded to the Ingalls Shipbuilding Division of Litton Systems, Inc., for 30 of these ships. Funding, under the terms of the contract, is to be applied in increments over the 5 fiscal years from 1970 through 1974.

This year's increment is the next to last for ships No. 17 through 23. The seven ships in this year's program are estimated to cost $610 million (TOA). They will replace ships over 30 years of age in fiscal year 1977 when delivery of this increment begins.

Litton Shipyard, Miss.

Chairman Ellender. How is the program at Litton turning out? Are they on time or have there been delays?

Admiral King. As you know, Mr. Chairman, the program at the Litton Shipyard which is at Pascagoula, Miss., includes the LHA ships currently building. The DD-963 class commences actual fabrication; that is, metal bending, in January 1973; therefore, the DD-963 program, at this time, remains in the design and preparatory stage, the ordering of material and the like, preparatory to the actual cutting of metal.

The design of the 963 has been, until the last few months, reasonably well on schedule. At present, we estimate they are a few weeks behind in their design as compared to the plans.

We, of course, are in constant communication with the Litton organization in order to monitor this project and it is their belief, as of this time, that the design scheduled slippage which has occurred can be made up.

I want to emphasize that no metal was intended to be cut in this program until January 1973, and that is still the intended date.

Escalation Charges and Cost Schedules

Chairman Ellender. Well, insofar as the cost element may be considered, have there been any changes or has that been in accord with the contracts made?

Admiral King. Except for unforeseen escalation, the cost schedule for the DD-963 are presently as previously reported and made known to this committee in the December 31 SAR.

Chairman Ellender. What do you mean by "unforeseen escalation"?

Admiral King. The escalation charges, of course, which we estimate in the early stages of a program have to be adjusted by what is actually experienced as time goes on. The actual escalation does not always accord with predicted amounts.

Chairman Ellender. How do you adjust that to the contracts you have? I presume you have contracts for a certain number of ships at so much.

Admiral King. Yes. The contract includes procedures for calculating escalation, Mr. Chairman.

Chairman Ellender. Such as wage changes?

Admiral King. The procedures utilize Bureau of Labor statistics indices as an input. These indices generally reflect what is expected in the shipbuilding industry. The contract makes reference to these BLS indices in a rather complex manner, which I would like to ask Admiral Sonenshein to address in detail if you are interested.

Chairman Ellender. Does that escalation apply to all elements used in the construction of a ship; that is, labor as well as materials?

Admiral King. Yes, sir.

Chairman ELLENDER. So when a contractor enters into an agreement with the Navy, as in this case, the contractor is protected against undue rises that may be due to inflation?

Admiral KING. Yes; that is generally correct, in the large scale and multiyear programs, Mr. Chairman. In that case we would not be able to induce a contractor to do business with us if we didn't give him some protection against unforeseen and difficult-to-predict amounts of inflation.

CAPABILITIES VIS-A-VIS WORLD WAR II DESTROYER

Senator ALLOTT. Mr. Chairman, may I ask a question or two?

Chairman ELLENDER. Yes.

Senator ALLOTT. As a "dry lander," tell me, other than being new and not being over 30 years old, in what respect does this destroyer excel over the World War II destroyer? What is your prime moving power? What is your speed? What is your firepower, and so forth?

Admiral KING. Well, there are hardly any aspects of this ship which are not representative of considerable advances over World War II destroyers. The propulsion power in these ships is to be furnished by gas turbines, giving us such things as immediate responsiveness rather than a 2-hour warmup period as required in the World War II ships.

Further, with gas turbine propulsion, it is possible to automate to a considerable degree the entire main propulsion system and this can provide direct control of the engines, for example, from the bridge. This is a tremendous help. It eliminates, also, a considerable amount of manpower and the savings in manpower these days are of intense interest to us as I am sure they are to you and other Members of the Congress.

In addition, this ship is larger by a considerable amount than World War II destroyers are for example. We are in the 7,000-ton class, about 7,600 tons which compares with something in the order of 2,900 to 3,000 tons for World War II destroyers.

FLETCHER CLASS

Senator ALLOTT. Is the *Fletcher* class a destroyer?

Admiral KING. Yes.

Senator ALLOTT. What was its weight?

Admiral KING. They were known as the 2,100 tonners nominally and I believe the gross tonnage was about 3,000.

Senator ALLOTT. So this destroyer is over twice as large?

Admiral KING. That is correct. This is reflected in sea-keeping ability, the ability to stay at sea and charge along at significant speed advantage over smaller ships that would bob around and which do not have the high power and other hull form characteristics which, are of great importance in these newer ships.

SONAR DEVELOPMENT

In addition, of course, we have in this ship an SQS-26 Sonar, a development of the past 15 years that is far better than any sonar conceived of in World War II. It is of such dimension and character that it simply cannot be installed in the World War II destroyers.

ARMAMENT

Senator ALLOTT. What is the armament of the new destroyer?

Admiral KING. Two 5-inch-54 lightweight mounts. These have an improved range over prior guns. For instance, in the World War II destroyers we have 5-inch-38 mounts with a maximum effective range of 17,500 yards and these reach out to [deleted] yards.

Furthermore, here, again, we have a manning savings in these mounts. In the old World War II manually loaded and served gun, we had to have a crew of seven or eight people in the mount. These new guns are automatic with no people in the mounts.

Senator ALLOTT. The mounts are shown on the bow in the forward part of the ship?

Admiral KING. Yes, one forward and one aft.

ANTISUBMARINE ROCKET LAUNCHER (ASROC)

Senator ALLOTT. Describe the ASROC.

Admiral KING. That is the antisubmarine rocket launcher in these ships which has a capability of firing eight antisubmarine rockets out to [deleted] yards prior to a reload. These antisubmarine rockets carry two different payloads; one is a nuclear depth charge and the other is a homing torpedo with a conventional warhead.

BASIC POINTS DEFENSE MISSILE SYSTEM (BPDMS)

Senator ALLOTT. What is the BPDMS?

Admiral KING. That is basic points defense missile system. This is a missile similar to the Sparrow missile, which is intended for use against incoming antiship missiles which, as you know, the Soviets have a great number of.

GUNFIRE CONTROL SYSTEM (GFCS)

Senator ALLOTT. What is the GFCS?

Admiral KING. This is the gunfire control system, which will control the 5 inch 54 guns.

Senator ALLOTT. Thank you, that is all I need to know.

CONTRACTS CLAUSES RELATING TO LABOR AND MATERIALS INCREASES

Senator COTTON. Referring to the contract, you stated, "Provision is made for increased costs in these Lockheed contracts." Is that a blanket provision which merely requires a contractor to make reports of increased costs or does it provide for renegotiation each time?

Admiral KING. Senator Cotton, may I ask Admiral Sonenshein to answer your question? He is more familiar with the contracting procedure.

Admiral SONENSHEIN. Thank you.

Senator, the question, as you expressed it, relates to the growth through inflationary forces.

Senator COTTON. Yes. I am not talking about where you change the scope of the work on the ship. It is like building a house, I know

what happens there, but I am talking about ordinary increased costs because of the lower buying power of the dollar, and how it extends to the contract.

Admiral SONENSHEIN. In each shipbuilding contract, we have a special clause that is described in considerable detail which relates to the projected growth of labor and material used in the basic construction contract. This is not a part of the end costs that relate to Government-furnished material or other reserve clauses that we have, I am talking only of the basic construction contract with the shipbuilder to assemble the material that he provides as well as the material provided by the Government. This is separate funding.

COST INDEXES

The escalation clause that is provided is in two parts, one dealing with labor and one with material.

In each case, we used historical data provided by the Department of Labor whose Bureau of Labor Statistics periodically publishes an index that reflects the inputs they receive from approximately 20 shipbuilders throughout the United States. We try to project those based on the previous experience and the market conditions as we see them. These indexes are applied to labor.

Another index that Vice Admiral King alluded to its one for material. We don't have as clear a picture there because there is no collection of data on shipbuilding material per se.

What is done for shipbuilding is that we take three categories of material, one being for steel and durable goods and another for electrical and another for a third set of components that are commonly produced, and aggregate those in a fashion to provide a shipbuilding material index. Having these two indexes and project them as best we know how for the next 6 or 7 or 8 years, we then provide in the contract itself that labor costs will be aggregated and reported by the contractor and accelerated in accordance with actual BLS indexes. Material costs will also be accelerated by these indexes as well. If the indexes were perfect, the projections would be perfect and no one would have any difficulty. The problem has arisen in the past in trying to project for 7 or 8 years what the economy really will be doing, having only hindsight for the basic data.

SHIPBUILDING CONTRACTS LONGEVITY

Incidentally, these shipbuilding contracts do indeed stay open from the time they are let until they are concluded, something like 8 years in some cases. The amounts to be included in the budget, which is the issue you would face, each year is provided, in the escalation reserve, and growth anticipation is always a matter of considerable debate and discussion within the Department of Defense and Labor Department.

DESTROYER (DD–963) CONTRACTUAL ALLOWANCE FOR ESCALATION

In going back to the DD–963, which was the case that arose and generated this discussion, in fiscal year 1970 when the contracts were first let, the allowance for escalation that we were permitted to include as a

reserve for these projections was not adequate. It was in the order of 7½ percent of the total basic construction contract. In 1971, I believe, we were permitted to raise it to 10 percent for the entire period of the basic construction contract.

Again, we need adjustments. This underlies the growth of the DD–963's; an average on it cost $83.5 million in 1970 to an average cost of $90.6 million now as reported in this fiscal year's budget.

Wage and Price Effect on Escalation Clause

One of the most recent aspects of this problem, which is the difficult economic prediction, is that the administration's actions to freeze wages and price growth has, in the last couple of months, to our observation, on the two indexes we are talking about—labor and material have been arrested. They are now undergoing a slow but steady growth, and if, in the next several months, we find this continues, it would appear that our reserves now in the 1973 budget request may well be adequate as to what we now foresee.

On the other hand, if that arrest disappears, or the faster rate of growth resumes, we may be in difficulty again.

Request for Cost Increase or Change Orders

Senator Cotton. Thank you.

Let's simplify it. If the increased cost, either labor or materials, does not exceed the limits laid down in advance in the contract, then the builder proceeds automatically, simply informing you of what the costs were. If it does exceed the agreed upon increase, does he have to come back for renegotiation with you?

Admiral Sonenshein. Well, sir; the escalation payments are made automatically based upon calculation of the actual indices multiplied by labor hours and the same with the other materiel costs. If he underruns and the actual costs are less than the escalation payments he then has an advantage in the total effort.

On the other hand, if he has escalation costs that exceed the escalation payments he may absorb the costs in other parts of the contract, but if his total becomes excessive or exceeds the target cost of the contract, then I am sure he would come to us, not necessarily for renegotiation, but wtih a request for cost increase or change orders to the contract which would involve negotiation. I shied away from the term renegotiation which implies something else, but in fact the shipbuilder would probably press us for a request for some kind of cost increase or change order whose value would be negotiated.

Private Shipyard Construction

Senator Cotton. Are these ships in Government shipyards?

Admiral Sonenshein. DD–963's?

Senator Cotton. Yes.

Admiral Sonenshein. No, they are under contract to private shipbuilders.

CONSTRUCTION OF SUBMARINES

Senator COTTON. Are any new submarines in Government shipyards?

Admiral SONENSHEIN. No new assignments, sir. Three submarines that were earlier assigned to Mare Island Naval shipyard are now being completed there.

GOVERNMENT SHIPYARDS: CONVERSION, ALTERATION, AND REPAIR

Senator COTTON. So that the Government shipyards are engaged in repair only?

Admiral SONENSHEIN. Conversion, alteration, and repair, yes, sir.

Senator COTTON. If any were done in Government shipyards, it would change somewhat this arrangement for considering of costs?

Admiral SONENSHEIN. In the Government yards, we do not enter into a contract, of course, with the activity, but issue a project order and allowances for escalation are kept at headquarters. There is a different arrangement.

DESTROYER FUNDING AND DELIVERIES

Chairman ELLENDER. Admiral, I am confused about the funding and delivery of these destroyers. In looking at the data sheet I note that Congress will have funded 30 of these destroyers—the total number planned—through fiscal 1974. On the other hand, I note that the first of these 30 ships will not be delivered until fiscal year 1975. Is this correct?

Admiral KING. The first ship of the 30, on which construction commences next year is to complete in 1975, or fiscal year 1975.

Chairman ELLENDER. You say you secured funds in 1970 and 1971?

Admiral KING. Yes, and 1972.

PAYMENTS TO CONTRACTORS

Chairman ELLENDER. Are any of those funds made available to the shipbuilder before delivery?

Admiral KING. Yes; we make progress payments to the contractor in accord with the terms of the contract to keep in step, as may be agreed upon, with his actual physical progress on the ship design and procurement of material and construction.

Chairman ELLENDER. Full funding costs are not paid for until delivery?

Admiral KING. By the time of delivery in every case, substantial progress payments would have been made to the contractor, sir.

Chairman ELLENDER. In advance?

Admiral KING. As actual physical progress is made to produce the ship; yes.

Chairman ELLENDER. Is it not unusual for a contract to provide funding for 20 or 30 ships in one contract? My recollection is that the normal procedure is for contracts of four or five at one time and payments are made as the ships are delivered.

Admiral KING. I would like to ask Admiral Sonenshein to answer that in terms of our usual multiyear contracts.

Chairman ELLENDER. Let me put it in another form, Admiral. I wish you would state to the committee what differences, if any, are contained

in the Litton contract as compared to your usual method of contracting for ships.

I understand you have contracted for 30 ships and that none of these ships will be delivered until 1975.

Admiral SONENSHEIN. Fiscal year 1975.

Chairman ELLENDER. Congress will provide full funding and in the meantime, I understand, you are advancing funds to this company as progress is made on building the ships.

MULTIYEAR CONTRACT

Admiral SONENSHEIN. Yes, sir. The multiyear contract for these 30 ships differs basically from ordinary one-time contracts for an individual year's buy, in that, as you already stated, sir; all of the ships are contracted for at once, in this case, 5 years into the future. A 5-year program was laid out and a contract was drawn.

As Admiral King has said, moneys flow into contracts annually, or, not moneys but, rather, authorization to proceed with construction for the next increment flow into the contract each year as the Congress authorizes and appropriates to the Department of Defense the moneys for that year's procurements. So that the Congress retains the prerogative and right each year to determine if another increment shall be authorized and appropriated.

That is the basic premise.

Of course, from this approach we expect to achieve considerable stability in the Government and in the particular shipbuilder in achieving results that are being sought building these necessary ships.

METHOD OF PAYMENT IN SHIPBUILDING CONTRACTS

Now, as to method of payment, in a normal shipbuilding contract, progress payments are made to the shipbuilder as he completes the work, it could be on a weekly basis or biweekly basis and, generally, it is biweekly.

Chairman ELLENDER. When you say "completes work" you mean a certain percentage of the construction?

Admiral SONENSHEIN. Yes; a certain percentage is completed and he makes a report to the supervisor of shipbuilding that he completed, say, 20 percent of the work. Our own inspectors and supervisors of shipbuilding examine the ship to satisfy themselves it is in fact, say, 20 percent or some adjustment thereto. At that point, he would bill us for that amount of work, whatever he accomplished at the last billing period, and we pay him to that extent for the work that has been accomplished and physical progress achieved.

This might be engineering drawings or it could be material procured or it would be actual fabrication of a ship.

Chairman ELLENDER. Percentagewise what costs of the ship are paid before it is delivered under this contract?

Admiral SONENSHEIN. Well, just if I may complete my statement, in the ordinary case, as you asked me to compare it?

Chairman ELLENDER. Yes.

PROGRESS PAYMENTS AND HOLDBACK

Admiral SONENSHEIN. Now, as the work progresses, in the first 50 percent of the actual completion we pay up to 90 percent, we hold back 10 percent.

In the second half, the last 50 percent, we hold back nothing that is, we pay up to 100 percent, so on average over the life of the contract, at the time of delivery, we have held back an average of 5 percent. This is the normal case. This is to take care of conditions that may occur after the ship is delivered which we would use the retention for reduced cost change orders to recompense the Government for work that happened after the ship had been delivered to correct deficiencies that were uncovered thereafter.

The same basic scheme applies here, too, as the physical progress in developing the design and physical progress in accomplishing the procurement of material, which is very extensive. As that is being recorded on a weekly basis we have been making progress payments to Litton for the DD–963 contract, and the holdback, and I have to verify it for the record, will be on the order of 5 percent at the end, when the ship is delivered. This 5-perecnt holdback, or retainage, is intended to cover the deficiencies that may be uncovered after delivery of the ship.

PRECONSTRUCTION PREPARATION

So, basically, the pattern between this contract and the ordinary ship acquisition contract with regard to progress payments is about the same. The period of execution though, is longer.

Chairman ELLENDER. Except for length of time and number of ships involved in this situation.

Admiral SONENSHEIN. The preparation is longer, Mr. Chairman, because we require him to design the ship and procure most of the materials, so there is a longer period of preparation before the construction starts.

Chairman ELLENDER. Is that a different method from what you used in the past?

Admiral SONENSHEIN. Yes; that represented a difference in that in other contracts we have done a lot of the design work ourselves or have done a lot of procurement ourselves and in this case the bulk, the biggest part, is turned over to him under terms of the contract. There is a longer period of preparation, that is basically what has happened.

COMPETITION FOR PRESENTATION OF DESIGNS AND PLANS

Chairman ELLENDER. I was under the impression that, before you submit a contract to a shipbuilder, you provided him with specifications or plans, and he would build according to those plans. Am I to understand, as you stated, the contractor designed these ships? Suppose there is escalation of the costs because of design changes at your request, since you didn't submit the design?

Admiral SONENSHEIN. Yes; I see what you mean.

Chairman ELLENDER. I think this is an unusual contract, isn't it?

Admiral SONENSHEIN. Mr. Chairman, in this case it is different; no question it is different from what we had done in the past, in other cases. But you recall in 1970 we concluded a design competition, with a contract definition period in which several shipbuilders proposed designs to us. This one was selected by the Navy. As the basic design is being elaborated into what we call systems design, he is doing that within the cost of the contract. As Admiral King indicated, so far he is staying within that cost.

Chairman ELLENDER. Am I to understand, then, that there was competition among shipbuilders to provide a satisfactory design and the Litton people presented an acceptable design within your cost estimates and that is the reason you selected them for the contract?

Admiral SONENSHEIN. You are correct, Mr. Chairman, in saying there was competition with various shipbuilding companies presenting alternative designs as well as production plans and management plans and other aspects of the total undertaking. But the Navy selected this one on the basis of all of these factors, the technical as well as cost and management and production approaches that were proposed. The technical proposal, of course, was a very important one, but, it was not the entire basis for selection.

Chairman ELLENDER. Admiral, do you anticipate any difficulty with this contract?

Admiral SONENSHEIN. I would say that we anticipate difficulty with all contracts, we always have.

Chairman ELLENDER. I am asking about this particular contract because, as I understand it, the contract is somewhat different from previous ones.

Admiral SONENSHEIN. To go back to your question about whether I anticipate difficulties. To be very honest, I would say, "Yes." We anticipate difficulty here because there may be an impact on this program from the preceding programs; that is the IHA which Admiral King mentioned. Those are being constructed as well as earlier Maritime Administration programs that are being constructed by the same builder. As this new yard shakes down, learns how to operate as a team and to take advantage of the great potential there that we see in their new facilities, there may be difficulties.

At this moment, in all honesty, I say to you that this contract is essentially on schedule and on the cost target, but I would not be honest if I didn't tell you there may be difficulties.

DELAYS AND COSTS

Chairman ELLENDER. Well, I presume if there are any difficulties, they would involve delays or something like that?

Admiral SONENSHEIN. That is right, it may be.

Chairman ELLENDER. Is that what you mean by difficulties?

Admiral SONENSHEIN. Or increased costs.

Chairman ELLENDER. But the increased costs resulting from inflation are provided for by the contract agreement.

Admiral SONENSHEIN. Yes, sir. But there may be other costs.

Chairman ELLENDER. Such as?

Admiral SONENSHEIN. For example, if in buying material, the material costs more than he budgeted for, that would be a reason. If in spending his labor, the number of hours it takes to build the ship is greater, we don't compensate for that in the inflation clause.

Chairman ELLENDER. I understand. Is the contract being performed as anticipated?

Admiral SONENSHEIN. At the present time, it is essentially on schedule.

FINANCING OF DESTROYER PROGRAM

Chairman ELLENDER. Through fiscal year 1972, Congress has provided a little over $1.4 billion for construction of 16 of these destroyers. As of January 1, 1972, how much of this $1.4 billion has been obligated?

Admiral KING. As of Januay 1, 1972, $620 million had been obligated. As of January 31, 1972, $1.08 billion had been obligated. The third increment obligated on January 26, 1972.

Chairman ELLENDER. As of January 1, 1972, how much of this $1.4 billion has actualy been paid to the contractor?

Admiral KING. As of January 1, 1972, $109.4 million has been paid to the contractor.

Senator YOUNG. In your discussion with Senator Allott, you referred to the fact that these new destroyers will have a gas turbine propulsion system. What is the current status of the development and testing of this propulsion system?

Admiral KING. The propulsion gas turbine to be used has been tested at sea on the gas turbine ship *Admiral Callaghan* for over 14,000 hours. This testing has indicated that satisfactory operation on the DD–963 is to be expected. The testing, as was its purpose, has uncovered items requiring corrections which have been made. Other testing ashore started in December 1971 and no significant problems have developed to date. The first production line engine for the destroyers is complete. It has undergone the Navy's high shock test and is now being run at the manufacturer's test facility to confirm it passed the test satisfactorily. Testing of the engines for the DD–963 will continue through 1974.

INFLATIONARY EFFECT ON COST

Senator YOUNG. I direct your attention to the cost history comparison data on page 4 of the ship data sheet. There it is indicated that the initial planning estimate for these 30 ships was a total cost of $2,581.2 million, which equates to $86 million per ship. The current estimate for these 30 ships is $2,717.9 million, which equates to $90.6 million per ship. Would you say that most of this increase is the result of inflation?

Admiral KING. Yes. As initially reported in the September 30, 1970 selected acquisition report for DD963, escalation procedures were revised to reflect actual and future wage and price levels. Under the revised procedures, estimates were upgraded to reflect specific contract provisions, escalation that had occurred through June 30, 1970, and a projected index to completion of contracts. This more specific computation of escalation costs indicated an increase in estimated costs of $136.5 million for th program.

INITIAL PLANNING ESTIMATE

Chairman ELLENDER. The initial funds for the construction of these destroyers were requested in the budget for fiscal year 1969. That request was for $246 million for five ships, which included $78.4 million for the lead ship and $41.9 million for each of the four follow-on ships. As I recall at this time, we were talking about these ships costing about $50 million each. Why do you use the $86 million estimate as the "initial planning estimate" rather than these earlier estimates when you were first requesting funds for the construction of these ships?

Admiral KING. As indicated in the March 1971 General Accounting Office report to Congress on the DD963 destroyer, "the estimated total development and production cost for 30 ships had increased from the approved planning estimate of $1,784.4 million to the development estimate of $2,581 million as of June 1970, an increase of $796.8 million. The planning estimate of $1,784.4 million prepared by the Navy in November 1967 prior to the initiation, validation and ratification was based upon a conceptual ship design. The development estimate of $2,581.2 million, using fiscal year 1971 pricing guidelines, is based on the actual designs and prices contained in the development and production contract awarded to Litton Systems, Inc., on June 23, 1970. The data contained in this contract made it possible for the Navy to more accurately estimate the development and production costs of the program which were included as part of the development estimate." After the production contract was signed, the Development Estimate (DE) became the baseline estimate.

Chairman ELLENDER. Thank you.

GUIDED MISSILE FRIGATE CONVERSION

The next item to be considered is the request for $93.5 million for two guided missile frigate conversions. The ship data sheet will be included in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

Service: Navy.—Nomenclature: Guided Missile Frigate Conversion: P1 Line Item: 16/17/14; *Popular Name*: N/A.

Mission/Description.—To operate offensively, independently or with strike, anti-submarine or amphibious forces against submarine, air, and surface threats.

COST DATA

[In millions of dollars]

	Fiscal year—								Cost to complete	Current estimate, total price
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Quantity	10	4	2	2	2					20
Ship cost	352.3	166.1	177.3	124.0	180.5					940.2
Less advance procurement	10.6	45.9	33.0	30.5	47.3					167.3
Net calendar year progress	341.7	120.2	84.3	93.5	133.2					772.9
Advance procurement fiscal year	61.4	33.5	26.3	46.1						167.3
Weapons systems cost	403.1	153.7	110.6	139.6	133.2					940.2
Outfitting/post delivery	9.0	18.2	20.4	8.8	10.7	18.4	.7			86.2
R.D.T. & E.										
Milcon										
Program acquisition cost										1,026.4
Average unit cost										51.3
Total additional cost										

Basis for Fiscal Year 1973 Request.—The DLG–6 and DLG–16 classes of guided missile frigates—19 ships in all—are undergoing a modernization program which was approved by SECDEF in 1964 and started in fiscal year 1966. DLGN–25 is the 20th ship in the program. The updating will give all ships of both DLG classes the capability to use either the modern homing Terrier or the Standard missile. The modernization also converts four ships of the DLG–6 class from the obsolescent beam-riding Terrier to the dual capability of homing Terrier or Standard missile. The modernization will provide the DLG–6 and 16 classes with an improved longer range surface-to-air missile system and a corresponding greater anti-war warfare capability. They will also have installed the Navy Tactical Data System, the latest three dimensional air search radar and the latest in fire control radars and computers. These improvements will give the ships increased acquisition range, reduced reaction time and a greater kill probability. FY 1973 contains a funding request for two ships of the DLG–6 class. The program is geared to industrial capability and ship availability. To date 11 DLGs have completed modernization, three are currently in the shipyard and five are scheduled in a program which continues through fiscal year 1974.

Test Data.—All equipments which are to be installed are service approved.

CONTRACT DATA

	Contractor	Type contract
Basic construction:		
(DLG 16 CL)	Bath Iron Works, Bath, Maine	FFP
(DLG 6 CL)	Philadelphia Naval Shipyard, Philadelphia, Pa	
(DLGN–25)	Shipyard to be assigned	
Major subsystems:		
AN/SPS–48 3–D radar	ITT Gilfillan, Inc	FFP
MK 76 fire control system	Sperry-Rand Corp	FFP
NTDS	Univac, Hughes Aircraft & Collins Radio	FFP
SSTG's:		
(1000 kw.)	DeLaval Turbine, Inc	FFP
(1500 kw.)	Worthington, Corp. & Westinghouse	FFP

CHARACTERISTICS

	Class	DLG 6 class	DLG 16 class	DLGN–25
Displ. Full load	U	5,800 tons	7,800 tons	8,400 tons.
Lgth OA/Beam ext	U	513 feet/53 feet	533 feet/55 feet	564 feet/58 feet.
Draft, max navig	U	25.4	25	31.
Speed	C	[Deleted.]	[Deleted]	[Deleted]
Shaft HP/No. screws		85,000/2	85,000/2	60,000/2.
Radars	U	AN/SPS–10, 29, 48	AN/SPS–10, 43, 48	AN/SPS–10, 37, 48A.
Sonars	U	AN/SQS–23	AN/SQS–23	AN/SQS–23.
Guns	U	(1) 5″/54 RF single mount.	(2) 3″/50 RF twin mount.	(2) Phalanx.
Other ordnance	U	(1) Terrier launcher (1) ASROC launcher (2) MK 32 triple torpedo tubes.	(2) Terrier launchers (1) ASROC launcher (2) MK 32 triple torpedo tubes.	(2) Terrier launchers. (1) ASROC launcher. (2) MK 32 triple torpedo tubes.

Inventory data.—DLG–6 through DLG–24 and DLGN–25 (20 ships, total) active with fleet except for modernization periods as follows:

Ship:	Dates
DLG–16	February 1967 to August 1968.
DLG–17	February 1968 to June 1969.
DLG–21	September 1968 to January 1970.
DLG–6	May 1968 to February 1970.
DLG–15	January 1969 to April 1970.
DLG–24	April 1969 to May 1970.
DLG–18	November 1969 to November 1970.
DLG–14	November 1969 to February 1971.
DLG–7	February 1970 to July 1971.
DLG–22	May 1970 to May 1971.
DLG–19	November 1970 to November 1971.
DLG–9	February 1971 to May 1972.
DLG–20	May 1971 to May 1972.
DLG–23	November 1971 to November 1972.
DLG–12	February 1972 to May 1973.
DLG–13	{Deleted.}
DLG–8	
DLG–11	
DLG–10	
DLGN–25	

COST HISTORY COMPARISON

	Quantity	Amount (millions)
Initial planning estimate:		
Procurement	20	$698.8
R.D.T. & E		
Milcon		
Total program costs		698.8
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	20	887.9
R.D.T. & E		
Milcon		
Total program costs		887.6
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	20	1,026.4
R.D.T. & E		
Milcon		
Total program costs		1,026.4

Brief Explanation of Differences Between fiscal year 1972 and fiscal year 1973.—Variance between $1026.4M (fiscal year 1973) and $887.6M (fiscal year 1972) ascribed to increasing need to deliver ships which meet latest specifications for operability, safety and habitability; extended service deterioration being experienced in later program ships; and increased cost of work performed in Naval shipyards (105.7); additional characteristic changes (19.6); outfitting/post delivery adjustments (13.5).

Senator YOUNG (presiding). You may proceed, Admiral King.

Admiral KING. Thank you, Mr. Chairman. These, too, are conversions being requested in continuation of a program begun some time ago—in fiscal year 1966. After completion of these two modernizations, one ship will remain to complete our planned program to upgrade

19 anti-air warfare ships of this type. That is the DLG conversion program.

This modernization will provide these ships with the capability to launch either the homing Terrier or the Standard missile from the same launcher. They will receive the Navy tactical data system, an improved three dimensional air search radar and an improved guided missile fire control system. These changes will provide increased target acquisition range and a markedly reduced reaction time with a greater kill probability, against, particularly, air targets.

These two conversions are estimated to cost $124 million. The total obligational authority requested is $93.5 million.

NUMBER OF SHIPS TO BE MODERNIZED

Senator YOUNG. You indicated that, after the completion of these two modernizations, one ship will remain to complete your planned program to upgrade 19 anti-air warfare ships of this type. However, I note on the data sheet a reference to 20 of these ships, with an indication that you will request funds for the conversion of two in fiscal year 1974. Could you straighten me out on this matter?

Admiral KING. As listed on the P-1 in the budget exhibits, 19 ships of the DLG 6/16 class are grouped under the AAW conversion, and the DLGN 25 is displayed separately, because of its nuclear characteristics. Both types were combined on the data sheets to reduce administrative effort.

ADVANCE PROCUREMENT

Senator YOUNG. The difference between the cost of $124 million for these two conversions and the $93.5 million requested is the $30.5 million advance procurement provided in prior fiscal years?

Admiral KING. Yes.

ADVANCE PROCUREMENT

Senator YOUNG. I note on the ship data sheet a fiscal year 1973 request of $46.1 million for advance procurement. I assume this total is made up of the $16.1 million on line 17 associated with the conversion of a conventional guided missile frigate and $30 million on line 14 associated with the conversion of a nuclear powered guided missile frigate. Am I correct about this?

Admiral KING. Yes.

PATROL FRIGATE

Senator YOUNG. The next item to be considered is the patrol frigate, costing $191.5 million. The ship data sheet will appear in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

Service: Navy—Nomenclature: PF Patrol Frigate; P1 Line Item: 23 Popular Name: PF.

Mission/Description: To conduct offensive ASW operations and provide ASW and AAW protection to underway replenishment groups, amphibious forces, and military and merchantile shipping in conjunction with other planned and existing sea control forces.

COST DATA

[Dollars in millions]

	Fiscal year—								Cost to complete	Current estimate total prog.
	1970	1971	1972	1973	1974	1975	1976	1977		
Quantity				1						[1] 50
Ship cost				191.5						2,717.4
Less advance procurement						[Deleted]				
Net current year program				191.5						
Advance procurement calendar year										
Weapons systems cost				191.5						2,717.4
Outfitting/post delivery										[2]
R.D.T. & E		0.9	11.7	1.5						14.1
Milcon										
Program acquisition cost										2,731.5
Average unit cost										54.6
Total additional cost										

[1] Current procurement planning envisions no less than 2 production blocks of approximately 25 ships to allow characteristics review and change as experience is gained. However, specific approval of this program beyond fiscal year 1973 awaits Navy submission and Secretary of Defense approval of PF development concept paper.

[2] To be determined.

PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET (CONTINUED)

Basis for fiscal year 1973 Request.—The escort problem confronting the Navy is a deficiency measurable in both numbers and capability of escort assets, aggravated by programmed retirement of obsolescent destroyers that do not now have the weapons, sensors, or growth potential for modernization. The objective of the Patrol Frigate (PF) Program is to acquire for the late 1970s–1980s time frame a class of ship which will effectively supplement existing and planned AAW and ASW combatants in providing AAW and ASW protection to amphibious forces, underway replenishment groups, and military and mercantile shipping against air, surface, and sub-surface threats, and be capable of conducting offensive ASW operations independently or in conjunction with other sea control forces tasked to ensure our use of essential sea lines of communication. The PF request for FY 1973 is for procurement of the lead ship of the program.

Test Data: Equipment:	*Projected service approval date*
MK 309 Control Panel	2nd quarter, fiscal year 1973
MK 92/2 FCS	3rd quarter, fiscal year 1975
35 mm OTO MELARA Gun	3rd quarter, fiscal year 1975
AN/SSR–1 UHF SATCOM Broadcast Receiver	3rd quarter, fiscal year 1973
AN/UPX–24 Central IFF	3rd quarter, fiscal year 1972
AN/SRN-( ) TACAN	2nd quarter, fiscal year 1973

Contract Data:

Basic Construction—(To be determined.)

Major Subsystems

Propulsion
MK 92/2 FCS
MK 13 GMLS
AN/SQQ–23 PAIR Sonar

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE SHIP DATA SHEET—Continued

Characteristics	Class	Item model, series, class, etc.
Displ. full load	U	3400 tons.
Lgth OA/beam Ext	U	450'/45'.
Draft, Max Navig	U	23'.
Speed		28 + Knots.
Shaft HP/No. screws		40,000 HP.
Radars	U	AN/SPS–49/ATD, AN/SPS–55.
Sonars	U	AN/SQQ–23 (PAIR).
Guns	U	35 mm OTO MELARA.
Other ordnance	U	MK 92 MOD 2 fire control system, MK 13 guided missile launching system, (2) MK 32 MOD 7 torpedo tubes, LAMPS.

Inventory Data.—Ships of the Patrol Frigate Program will phase into the Fleet beginning with the first ship delivery scheduled in late FY 1977.

Production Data: [Deleted.]

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

COST HISTORY COMPARISON

[Dollar amounts in millions]

	Quantity	Amount
Initial planning estimate:		
Procurement	50	$2,717.4
R.D.T. & E		14.1
Milcon		
Total program costs		2,731.5
Current estimate total program (fiscal year 1972 budget submission):		
Procurement		
R.D.T. & E		
Milcon		
Total program costs		
Current estimate total program (fiscal year 1973 budget submission):		
Procurement	50	[1] 2,717.4
R.D.T. & E		14.1
Milcon		
Total program costs		2,731.5

[1] Average follow ship cost equates to $51,500,000 excluding R.D.T. & E. and outfitting material/post delivery charges

$51.6 million in FY 1972 SCN was requested by amendment to the President's budget to provide funding for production start-up and critical long lead item procurement in addition to carrying out requisite design effort. In view of the decision to defer authorization of these initial funds, an alternate plan was developed, using reprogrammed FY 1972 funds, which reduced the FY 1972 funding requirement by deleting production start-up costs and actual material procurement. With current planning, essential ship design, system integration, and pre-production engineering/planning are allowed to proceed and lead ship delivery slippage is reduced to only six months. Additional variance is attributed to refinements of prior estimates, ship characteristics changes, and inclusion of funds to purchase ship equipment for a universal gas turbine hot plant.

Admiral KING. Last year the Congress deferred our request for advance funding for this new and urgently needed program. Because our request last year included funds to continue the design effort, the Navy faced the possibility of terminating the PF design and disbanding the design team. If we had stopped the project a protracted and serious delay in obtaining these badly needed ships would have resulted, a delay which we estimated to be about a year or more. In view of this, we continued our planning with existing and appropriate research and development assets for advanced ship design. Also using reprograming of fiscal year 1972 funds, for which congressional approval is sought, this year we plan to continue the in-house contract phase with industry participation when preliminary designs are completed.

REPROGRAMING

Senator YOUNG. How much will be obligated other than the amount you requested for reprograming, which I believe was $8.4 million?

Admiral KING. 8.35 is the reprograming requested.

Mr. Chairman, let me see if I can get that.

ADVANCE SHIP DESIGN

In 1971, it is $970,000 and in 1972 it is about $3.4 million, so you would have a total of about $4.3 million which has thus far been ex-

pended in that for pursuit of preliminary work for design of this ship.

Senator YOUNG. You can do that in research and development without it being authorized?

Admiral KING. There is a line item in the research and development appropriation for advanced ship design. This is the source of the bulk of the funds which have been expended.

PF ACQUISITION BRIEFING

We have also conducted an industry briefing to acquaint shipbuilders with our plans for PF acquisition. This procedure is in accordance with prescribed provisions of the armed services procurement regulations (ASPR). At this briefing, industry was fully informed of the preconditions of congressional approval for any ensuing contracts. I want to emphasize that our action to date has in no way committed the Navy or the Congress to this program.

DESIGN AND PROCUREMENT

With this budget request we are seeking authorization and funding for detailed design, and procurement of the lead ship of this new class only.

There is an urgent need for this new class to overcome shortages in surface combatant forces for our amphibious groups. Underway replenishment groups and military or mercantile convoys. Due to rising costs and budget limitations, our building program for escorts has failed to keep pace with the growing obsolescence of our World War II destroyers. Consequently, we now have a severe and growing shortage of surface warships. It is also apparent that it is no longer economically feasible to build true general purpose destroyers in the numbers needed.

The patrol frigate is in preliminary design and will incorporate the latest available systems and techniques to insure reliability, maintainability, and low costs of operation and manning. We project a total program of about 50 ships to be procured through fiscal 1979. Our budget request this year includes all the nonrecurring costs with the lead ship rather than having the costs prorated across the total procurement. Thus, authorization and approval for the lead ship this year will constitute the only commitment of the Congress at this time. This ship will be about 3,400 tons in size and will possess excellent ASW and AAW capability for its size. It will have a surface-to-surface missile capability and will be configured for the Lamps helicopter system. We estimate the lead ship at $191.5 million (TOA). Our target price for up to 30 or more follow-on ships is $45 million each exclusive of cost increases which may arise from escalation factors over which we have no control.

Senator YOUNG. On the ship data sheet under the 1972 column for R.D.T. & E., I note an entry for $11.7 million. Does this include the reprograming of $8.5 million that we just discussed?

Admiral KING. Yes, sir.

Senator YOUNG. I note in the fiscal year 1973 column, there is a request of $1.5 million in R.D.T. & E. for this ship. Just what is this for?

Admiral KING. These funds are required to continue the design effort, under the continuing obligation authority, until the fiscal year 1973 appropriations bill is passed and the SCN funds for the lead ship become available.

Senator YOUNG. What type of propulsion system do you envision for the patrol frigate?

Admiral KING. Two General Electric LM–2500 gas turbines will power a single controllable, reversible pitch propeller.

Senator YOUNG. I note that you are talking about a ship of some 3,400 tons, which is considerably smaller than the DD–963 which has a displacement of about 7,600 tons, as I recall. Will the primary antiair weapon be the 35-millimeter gun?

Admiral KING. The primary antiair weapon will be the standard missile (medium range). The Oto Melara 35-millimeter gun is a secondary weapon.

Senator YOUNG. What type of aircraft would the gun be effective against?

Admiral KING. This gun would be effective against any modern aircraft.

Senator YOUNG. Please comment on the MK–13 guided missile launching system and describe its capabilities.

Admiral KING. The MK–13 launcher will fire either the surface-to-air standard missile or the surface-to-surface Harpoon missile. Its magazine carries [deleted] missiles and can be loaded with any mix of these two types. [Deleted.]

Senator YOUNG. I guess the MK–32 torpedo tubes are the primary ASW weapons. How effective will this be against the current submarine threat?

Admiral KING. The MK 46–1 torpedo is our primary weapon and it can be delivered either from the MK–32 torpedo tubes or by the Lamps helicopter. This torpedo is our best operational ASW torpedo and will achieve satisfactory effectiveness against the current submarine threat.

Senator YOUNG. I note that you expect to have the Lamps helicopter on this small ship. Please comment on the capabilities this helicopter gives this ship.

Admiral KING. This helicopter improves our capabilities in three major areas. In ASW it gives us the capability to localize and attack submarines far from our ship or formation. In surface warfare it enables us to extend the ships radar horizon in order to [deleted]. We also expect the helicopter to contribute to the antiship missile defense of the PF, but we are still evaluating alternatives in this area.

REQUIREMENT FOR PATROL FRIGATES

Senator YOUNG. Admiral, I want the record to indicate that the patrol frigates we have been discussing are not directly related to the question of an additional nuclear-powered carrier. That question involves the requirement for additional nuclear-powered guided missile frigates.

Admiral KING. That is correct, Senator Young. These patrol frigates are by no means equal to the destroyer types that are required to support the attack carriers. The patrol frigates are intended to make up

for a severe short-fall in ships to escort amphibious groups, underway replenishment groups, and convoys.

CONTROL FRIGATE PROGRAM: COST, SIZE, AND MANNING CEILINGS

We have made a great effort in this patrol frigate program to design an austere ship with minimum operational costs and minimum manning, well below the manning level of prior ship classes, just for the reason that we know we must keep the costs down. We have rigidly applied cost, size, and manning ceilings to the design of this ship and have cast out a number of nice-to-have features simply because they breach our very tight ceilings on cost, size, and manning.

NUCLEAR AND CONVENTIONAL CARRIER FUEL COSTS

Senator YOUNG. What is the difference between the fuel cost of a nuclear-powered carrier and a conventional one? I do not refer to construction costs, but to the actual costs of fuel.

Admiral KING. Admiral Linder can address this. He is the program coordinator for the *Nimitz* class nuclear attack carrier shipbuilding program.

Admiral LINDER. In those words, it is a little difficult to pin down numbers because the SCN amount for CVN–70 in the budget includes the first reactor cores which provide fuel for 13 years of normal operations. If we consider all costs over the normal 30-year lifetime, the total expenditures for a carrier task force with a nuclear carrier turn out to be only 2 percent more than an equivalent expense assuming a conventionally powered carrier.

Senator ALLOTT. You are talking about fuel operating costs only?

Admiral LINDER. No, sir. I am talking about total expense for the task force.

Senator ALLOTT. I understood his question to relate to fuel only.

Senator YOUNG. I referred to fuel only.

Senator ALLOTT. It is pretty hard to make any comparison.

Admiral LINDER. The cost of a nuclear carrier has been studied a number of times but they look at the total task force costs, cost of construction, and operating the ship for 30 years normal service life instead of just looking at fuel costs. These studies indicate the total task force costs over this period of time increased by only 2 percent when a nuclear carrier is substituted for the conventional carrier.

Senator ALLOTT. Despite a much greater initial cost for the nuclear type ship?

Admiral LINDER. There is a larger initial cost but it includes 13 years of fuel.

Senator ALLOTT. There is a much greater initial capital investment?

Admiral LINDER. Yes.

Senator ALLOTT. A greater capital investment is involved, so another way of going about the question, since the two types ultimately come out almost on a relatively equal basis, is to say the fuel cost, which was Senator Young's question, for the conventional type has to be much less than the actual fuel cost of the nuclear type.

Admiral LINDER. Yes, sir; but when I talked about 30-year-life you should also understand that the higher standards built into the propulsion plant produce better reliability over the life of the plant.

Senator YOUNG. When you are buying a new nuclear carrier, at, say, $1 billion, you have to include about 13 years of fuel to it because what you are buying is 13 years of fuel supply?

Admiral KING. That is correct, Senator Young. You have to add the cost of 13 years' worth of fuel to the cost of the conventional ship.

In addition to that, you have to think of such effects as the cost of oilers to deliver fuel to a conventionally powered ship which is not required for the nuclear powered ship. The cost of just transporting all of that fuel and the terminal port costs for the oiler also have to be added to the cost of the conventionally powered ship. It gets to be a complex calculation over the life of the ship.

ADDED CARGO SPACE OF NUCLEAR POWERED SHIPS

Admiral SONENSHEIN. I can add one more aspect to this. The fact that a nuclear-powered ship does not carry fuel oil for its own propulsion permits it to carry other things. For example, the CVN 70 can carry 70 percent more aviation fuel than the latest conventional carrier and 90 percent more aviation fuel if she has nuclear escorts and her escort fuel tankage is filled with aviation fuel. She is also designed to carry 50 percent more aviation ammunition. In summary, the volume of oil that would have been carried for its own propulsion, if it were conventionally powered, now can be used to carry significantly more aviation fuel, fuel for escorts, and more ammunition.

ENERGY RESOURCES AND SUPPLIES

Senator ALLOTT. Mr. Chairman, I hate to divert to this question, but for the last several months I have been in another committee, the Interior Committee, and I have been going into the question of energy resources and supplies. I can't think of a more appropriate place to ask this question than here.

Assuming that we continue to have difficulties in the Near East and assuming the continued military buildup of the Soviets, it appears that this country is going to reach an energy crisis in some areas as soon as a year from now, certainly in almost every area by 1980. The Army Engineers testified the other day that they are engaging in long term plans for the exploration of deep water ports between Maine and Norfolk, to accommodate the new 250,000 ton tankers, which are being built at the present time.

TANKER PROTECTION

In the event that 4 or 5 years from now we would have to provide some protection for these tankers, perhaps by way of convoys, what do we have available for that at the present time?

Admiral KING. Sir, the answer is, we have available not enough ships and most of the ones that are available to perform those tasks are approaching or are at the point of being obsolete.

We are very much concerned about this entire matter of energy resources for this country, as we look down the road.

Admiral Zumwalt estimated by 1985 it will be necessary for us to import half, at least, of our oil, 12 million barrels a day, and this would require up to, from several hundred to possibly 1,000 tankers, dependent, of course, on the size and port availability, fully committed to delivering this oil to the United States. We simply do not have at this time in the U.S. Navy the force levels existing or planned to cope with a situation of that magnitude. And to be certain that the absolutely vital flow of this energy to the United States is maintained no matter what anybody else does, we cannot do.

Senator ALLOTT. I was here when Admiral Zumwalt testified, and I know his figures. Of course, those figures differ slightly, dependent upon the source of the studies and so forth, but not significantly.

ESCORT FRIGATE

In my own opinion, I believe the CNO is close to being accurate in his projections, in fact he might be optimistic although everyone may not agree. But regardless of that, would this type of ship be appropriate for that usage or, if you were actually using an escort, would you have to look to some other type?

Admiral KING. This ship was designed specifically with the mission in mind of assuring our free use of the seas and of escorting the kinds of ships that would bring in the oil and other raw materials.

Senator ALLOTT. I saw on the chart "and military merchantile convoy."

Admiral KING. That is correct.

Senator ALLOTT. I assume this would be generally the type of ship you would be thinking of, if you were asking for a budget for that type of ship.

Admiral KING. That is precisely correct. The ship is designed with a missile system to combat air threats and with a fine sonar and good antisubmarine weapons, both active and passive at least on a space and weight basis, to provide the systems which are for its own protection as well as for protection of ships that it may be escorting in the time frame of the 1980's, which we are talking about.

Senator ALLOTT. Thank you very much, sir.

DEPLOYMENT OF SOVIET SHIPS TO CHOKE OFF U.S. ENERGY SOURCES

Admiral KING. I would like to state in further response to Senator Allott's remark, the Soviets are well aware of the kinds of energy problems that we face in this country. There are, in the sealanes of the world, certain "choke" points, we might call them, through which a great deal of that oil has to flow and the [deleted].

Senator ALLOTT. These are military ships?

Admiral KING. [Deleted.]

[Colloquy deleted.]

Senator ALLOTT. Thank you.

DEPENDENCY OF AGRICULTURE ON PETROLEUM

Senator YOUNG. Practically all of our agricultural production is dependent on the use of petroleum. This is not true in many other countries of the world, particularly in China, where they use very little machinery and practically all manpower. Also, to a large extent, Russia could survive much longer than we could without the use of petroleum.

ESCORT (PATROL) FRIGATE

Admiral KING. May I say, also, Mr. Chairman, we in the Navy would like to do our bit in one other direction and that is to use more nuclear power and less oil in the future.

PATROL HYDROFOIL GUIDED MISSILE (PHM)

Senator YOUNG. The next item to be considered is the patrol hydrofoil guided missile (PHM) ship, for which $60.4 million is requested. The ship data sheet will appear in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

SERVICE: NAVY

Nomenclature: Patrol Hydrofoil Guided Missile (PHM) P-1 Line Item: 21; Popular Name: PHM

Mission/Description:

Intended Mission.—The United States version of the NATO PHM is to operate offensively against major surface combatants and other surface craft. To conduct surveillance, screening and special operations.

Primary Task.—Engage enemy surface forces with surface-to-surface missile system and secondary armament.

Contingent Tasks.—Conduct limited surface surveillance, patrol and blockade in coastal areas, island waters, and inland sea areas. Be capable of limited AAW self-defense. Augment screening of coastal convoys against surface attacks. Special operations, e.g., fast transport of lightly equipped troops. Augment screening ships during arrival and departure of convoys or amphibious task forces.

COST DATA

[Dollars in millions]

	Fiscal year—								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Quantity				2	[Deleted.]					[Deleted.]
Ship cost				$65.5						
Less advance procurement				5.1						
Net calendar year program				60.4						
Advance procurement, calendar year			$5.1							
Weapons systems cost			5.1	60.4					$14.4	
Outfitting/post delivery										
R.D.T. & E	$0.6		.2							
Milcon										
Program acquisition cost					[Deleted]				[Deleted]	[Deleted]
Average unit cost										
Total additional cost					[Deleted.]					[Deleted.]

Basis for FY 1973 Request.—The Navy was granted $5.1 million in FY 1972 for design and for advanced procurement of propulsion components, and weapon system/craft integration for the Patrol Hydrofoil Guided Missile (PHM) program. This effort is in progress. [Deleted] there exists a requirement in the U.S. Navy for high speed hydrofoil ships equipped with surface-to-surface missiles and secondary conventional armament.

NATO also has a requirement for a common Fast Patrol Craft (FPC), guided missile equipped, to answer the Soviet Surface threat. [Deleted.] The U.S. PHM program responds to our own need as well as the NATO requirement. The Fiscal Year 1972 funds have provided an early visible U.S. commitment to a hydrofoil program, which has had a significant effect in obtaining commitments from potential NATO partners in a joint program.

Participation in the NATO program is considered attractive because of the cost sharing associated with the design and the lower procurement cost of a larger buy. [Deleted.]

The design will be completed in early FY 73, allowing lead ship construction to follow immediately thereafter. Successful platform testing of the lead ship is a prerequisite to the follow-on production of U.S. PHMs. The prosecution of the entire NATO PHM program is highly dependent upon the construction and testing of the U.S. lead ships.

Test Data.—Equipments to be installed in FY 74.

Weapons:	*Service approval*
MK 92 (Variant) Gun Fire Control System	3rd Qtr FY 1975.
76 mm OTO Melara Gun	FY 1973.
76 mm Ammunition	FY 1973.
HARPOON Weapons System	FY 1975.
missile	FY 1975.
fire control	FY 1975.
launcher	FY 1975.

Tactical Electronics.—All electronics equip. service approved.
AN/ALR–47A—ECM Receiver, 490T–3R8 HF Tuner.
AN/ARN–99—Omega Receiver, SAT COM Antenna.
AN/ARC–138—UHF Communications.
AN/ARC–132—HF Communications.
AN/ARC–131—UHF Communications.

The Projected dates of service approval for all of the above items support the NATO PHM (U.S. Variant) program. However, procurement lead times for some of the items have necessitated the obtaining of waivers to initiate procurement in advance of completion of service approval milestones. In such cases, release for final production is contingent upon incorporation of service approval evaluation results.

Contract Data

Basic: construction:
Lead ships: Boeing Company (CPIF Construction, CPFF Lead Yard Services) Seattle, Washington.
Follow ships: To be determined through competitive negotiation (Fixed Price).

Major Subsystems.—Hydrofoils; Gas Turbine/Waterjet Propulsion System Missile Fire Control System.

Characteristics: Item, model, series, class, etc.

Displ. Full Load, 170 tons.
Lgth OA/Beam Ext., 120′ ± 20%/25′
Draft, Max Navig, 18′
Speed [Deleted] kts foilborne [deleted] kts hullborne
Shaft HP/No. Screws N/A Waterjet
Radars, MK 92 GFCS (Variant) AN–SPG–55 Navigational
Sonars, N/A
Guns, One OTO Melara 76mm
Other Ordnance, Four Harpoon Launchers
Inventory Data: None. This is a new ship type.

COST HISTORY COMPARISON

	Quantity	Dollars (millions)
Initial planning estimate (development estimate):		
Procurement	[Deleted]	[Deleted]
R.D.T. & E.		[Deleted] 0.8
Milcon		[Deleted]
Total program costs	[Deleted]	[Deleted]
Current estimate total program:		
Fiscal year 1972 budget submission: Advance procurement only		5.1
Fiscal year 1973 budget submission:		
Procurement	[Deleted]	[Deleted]
R.D.T. & E.		0.8
Milcon		[Deleted]
Total program costs	[Deleted]	[Deleted]

Note: The fiscal year 1972 submission was limited to advance procurement for the fiscal year 1973 program.

Admiral KING. Last year, Congress authorized and appropriated $5.1 million of advance funding to initiate a program for these new, highly effective ships. We plan to complete the design and specifications for these new ships early in fiscal 1973. This will be a unique class of ships having the capability to make high speeds—over 40 knots—in 12-foot seas. They will be small, displacing about 170 tons, and will carry the Harpoon surface-to-surface missile and 3-inch rapid-fire dual purpose gun.

The funds requested in fiscal year 1973 will be used to construct the first two lead ships including the ordnance and the electronics installations plus some of the long lead items not already purchased with fiscal year 1972 funds.

Senator YOUNG. These will have a displacement of about 170 tons?

Admiral KING. Yes. These ships have foils which are shown in the artist's view on the right which actually lift the hull of the ship above the waves so that the friction caused by the waves is minimized; that is, the waves, the sea surface, does not actually touch the hull of the ship in proceeding at high speed.

We have a small 60-ton prototype version of this hydrofoil ship in commission now. It has been very active and has been over to northern Europe and the Mediterranean with splendid results in demonstrating capabilities.

CAPABILITY

Senator YOUNG. Are you experiencing any trouble with it in high seas?

Admiral KING. This is one of the most encouraging aspects of the hydrofoil program. The small 60-ton ship, which I spoke of, has successfully proceeded at speeds in the neighborhood of 40 knots in SEASTATE [deleted] that is waves of up to [deleted] occasionally. This is just a remarkable capability. This could go out and make high speed, in other words, in dirty weather, which cannot be done now at those speeds in that kind of SEASTATE with any ship we have now. She flies along above the waves as though they were not there up to a point.

Now, in such places as the coastal regions in the United States waters or in the Mediterranean, we find this type, and the heavy weapons

this small ship can carry, coupled with ability to operate in very adverse conditions, just provides, in combination, a tremendous capability which we wish to exploit.

NATO PROJECT INTEREST

Senator YOUNG. Will this be used in connection with NATO? Do they have an interest in it or are they paying any part of the cost of it?

Admiral KING. There are several NATO nations that are exceedingly interested in these ships, in hydrofoils in general, and this specific class of ship. We have a combined project with the Federal Republic of Germany, Italy, and the United Kingdom and Canada right now exploring the design of these ships and at least two of the countries have indicated a very serious intention to join with us in a program to design and produce numbers of these patrol hydrofoils, the PHM. The most serious about the program at the moment seem to be Germany and Italy.

SHARING OF COSTS

Senator YOUNG. Are they paying any of the costs?

Admiral KING. We are preparing, Senator—well, first of all, the answer is at this moment "no," but we are preparing a memorandum of understanding in connection with this NATO project group which carries in it a proviso for a sharing of the design costs of the ship. We see Germany and the Italian Navy are very favorably disposed toward this program and the costs to be shared would be simply that which is preliminary to the production of the ship. We would expect them, of course, to pay for their own ships but we do expect they will join with us in the final cost.

Senator ALLOTT. Off the record.

(Discussion off the record.)

HISTORY OF HYDROFOILS

Admiral KING. We have experimented with these, Senator, and I am not sure the United States was first to produce a hydrofoil. There is a history that goes back many years with the experience of this general principle and I would like to supply for the record a summary of that history, Senator, if I may.

(The information follows:)

The U.S. Navy's interest in the potential of hydrofoils dates from the late 1940's. In the period 1947 to 1960, the Office of Naval Research, with support by the Bureau of Ships, sponsored a number of research and development projects directed toward the establishment of feasibility and fundamental criteria for the design of hydrofoil craft including theoretical analyses and model experiments. Tests were conducted on a variety of small craft. Of the small hydrofoil craft, the SEALEGS is perhaps the most notable. SEALEGS, through the joint efforts of Gibbs and Cox and the MIT Flight Control Laboratory, provided the first real demonstration of the feasibility and advantages of a fully-submerged, automatically controlled foil system. The many hours of foilborne operation of SEALEGS produced much valuable data which formed the foundation for the design of the PCH–1 and other hydrofoil craft. In 1967, SEALEGS was retired and donated to the Smithsonian Institution.

The year 1960 was a significant milestone in the Navy Hydrofoil Program. At that time it was decided that sufficient data had been accumulated to demonstrate that large submerged-foil craft are feasible and that such craft could provide the Navy with a significantly advanced, high-speed mission capability. As a result, an accelerated program of development was initiated using emergency funds made available to support an expanded research and development effort. Also, Fiscal Year 1960 ship construction funds were allocated for the design and building of the PCH–1, a 120–ton hydrofoil patrol boat. Later, in Fiscal Year 1962, funds were allocated for the design and construction of the AGEH–1, a 320-ton experimental ASW hydrofoil ship, the largest in the world to date. Finally, in early 1966, contracts were let for the construction of two Patrol Gunboat Hydrofoils (PGH), one by the Grumman Aircraft Corporation and the other by the Boeing Company.

During the period from 1960 to the present there has been a continuing program of supporting research and development directed toward solution of problems and the generation of criteria for the design of hydrofoil craft subsystems including hull, struts and foils, propulsion, ship control, and auxiliary machinery. The results of much of this work have been incorporated in the design of the PHMs being requested in our Fiscal Year 1973 shipbuilding program.

Admiral KING. I would say we have the largest hydrofoil in the world in the U.S. Navy and, generally speaking, the NATO nations that we are associated with in the development project are in agreement that our designs are the most technologically advanced and have been well proven to gain this capability we want to exploit.

Admiral Sonenshein would like to respond additionally on that.

Admiral SONENSHEIN. Yes, because I think we could be proud of this particular record in the U.S. Navy, which we have established.

Hydrofoils have been well known for many, many years. In fact, Alexander Graham Bell, we all know, designed and built a hydrofoil many years ago that made a pretty good speed. I think the most significant thing about the development of hydrofoils, though, of which we can be proud, is the development of the kinds of foils that can operate in the open sea, as opposed to rivers, harbors, and protected waters. This type of hydrofoil worked overseas. Italy in particular, and other countries such as Russia, have concentrated on what we call surface piercing foils, foils that are submerged or immersed, depending on how the ship moves.

SUBMERGED FOIL CONTROLLED BY AILERONS

The U.S. Navy, about, I would say, 1956, or 1958, decided to adopt the concept of submerged foil controlled by the ailerons, the ailerons to be controlled by autopilots.

This is the key to our current development. Submerged foils, the trailing edge of which can be tilted, just like the ailerons of an airplane and the control thereof exercised automatically through a computer, to provide a steady attitude above the waves, providing thereby a stable platform for military applications.

This development and our decision to pursue it is the key to our current successes with the succeedingly larger sizes of hydrofoils moving now to the application we are proposing here.

FUEL CONSUMPTION

Senator COTTON. What about the relationships with other types?

Admiral SONENSHEIN. The fuel consumption is what you are thinking of in line with that, sir?

Senator COTTON. Yes.

Admiral SONENSHEIN. These kinds of craft, which can make [deleted] knots, for example, are using gas turbines as planned because they are lightweight and the compactness comes in, and would compare very favorably at the higher speeds, because the higher speeds—the conventional boat, that is, the displacement type craft, as we call it—with their hull in the water, will use a lot of fuel, and in fact it won't even make a speed, it is hard to make comparison on the high speed, because a conventional craft cannot make that speed. At the lower end of the spectrum, though, they are very comparable.

Senator COTTON. Thank you.

TOTAL REQUIREMENT

Senator YOUNG. I note that your current program calls for construction of [deleted] of these hydrofoil craft. How was the requirement for this total number computed?

Admiral KING. [Deleted.]

Senator YOUNG. In order that the record will be clear on this item, as I stated, the estimated cost of these two ships is $65.5 million, but this is offset by $5.1 million advance procurement provided in fiscal year 1972, giving a net requirement for $60.4 million for these ships. Have I stated this correctly?

Admiral KING. Yes, that is correctly stated. The fiscal year 1973 request is for $60.4 million.

Senator YOUNG. Give us three or four examples of how these ships would be deployed once they become operational.

Admiral KING. [Deleted.] Another employment of the PHM would be in combined exercises with other NATO PHMs, currently limited to Italy in the Mediterranean and Germany in the Baltic and North Seas.

These exercises will be conducted primarily to develop NATO tactical doctrine and in perfecting coordinated attack procedures. The development and refinement of U.S. tactical doctrine will be a principal task of the east and west coast based squadrons. Since the PHM is a potent surface strike weapon system having a capability that our Navy has not had before, much imagination and tactical employment will be needed, including intensive training in home waters, to maximize PHM effectiveness in the fleet. These ships are expected to be useful, in war, in several roles, including patrol and interdiction of straits and narrow seas, guarding ports, and seeking and attacking enemy ships.

PROPULSION SYSTEM

Senator YOUNG. I note that the propulsion system for these craft is the water jet concept. Has this concept been fully proven?

Admiral KING. We feel that the water jet propulsion system has been proven in the 3 years' experience in *Tucumcari*. In fact, *Tucumcari* has operated for over 1,000 foilborne hours, more than any of our other hydrofoils, in waters all over the world with only two casualties of any significance. The first was the injection of 40mm. spent brass cartridge into the inlet which was sucked into the pump and jammed. The pump casing was opened, the cartridge removed, the casing put back and pump was back in operation. Since this incident, a coaming was put around the 40mm. gun to keep the spent brass from falling over the sides. The other incident was a stress crack in the

pump casing that developed after over 900 hours while *Tucumcari* was operating in Italy. This was repaired by welding at the Taranto Naval Base and a reenforcing web was attached to prevent reoccurrence. The simplicity of the centrifugal water jet jump makes it a very reliable and easily maintained propulsion system.

Senator YOUNG. Earlier, we discussed the gun to be used on this ship. I note that it is a 76mm. gun. Give us some idea of the effectiveness of this size gun.

Admiral KING. The 76mm. gun was selected by the United States and by all our NATO partners because of its relatively light weight and high rate of fire. This gun provides self-defense against aircraft and limited close-in self-defense against missiles. It also provides sufficient penetrating firepower against surface targets to provide this attack option in performing the PHM primary mission of surface attack.

Senator YOUNG. It is indicated that this hydrofoil craft will be equipped with four Harpoon missile launchers. Please comment on the capabilities of the Harpoon missile.

Admiral KING. The 1,500-lb. Harpoon surface-to-surface missile with [deleted] lb. warhead is being developed for surface combatants, including the PHM. It will have a solid rocket boost missile with turbojet sustainer. It needs no guidance after launch, has an active radar seeker with midcourse inertial guidance and is a low-altitude, or "skimmer" missile. Harpoon is superior to other NATO missiles in hit effectiveness and other cost effectiveness parameters. Depending on the initial missile guidance provided, Harpoon is effective out to the horizon and up to [deleted] miles. Of particular interest is the ability of Harpoon to hit [deleted].

Senator YOUNG. When would you expect these two ships to join the fleet?

Admiral KING. Delivery to the fleet of the first two PHM's is scheduled in [deleted]. By then, the Harpoon is planned to have passed test and evaluation and be in production.

Senator YOUNG. What would be the size of the crew of this patrol boat?

Admiral KING. Total onboard crew size, officers and enlisted, is about 20 personnel.

Senator YOUNG. I note that you are talking about 170-ton displacement and a length of 120 feet and a beam of 25 feet. How does this compare to our World War II torpedo boats?

Admiral KING. The PHM has about 3½ times greater displacement tonnage, is one-half again as long, and has about 4 feet greater beam width than the average World War II PT boat.

ARMAMENT

Senator YOUNG. I understand we have to go to foreign countries for a gun for this ship, since we don't have our own gun, do we?

Admiral KING. I think we have to face, frankly, the fact that our gun development programs in this country have simply not kept pace with those in certain European countries, Senator. As to the reason why, I think there is a complex of reasons. The requirement for these have not been thought to take priority over certain other things we are trying to do.

Senator YOUNG. Which country best develops these kinds of guns?

Admiral KING. The particular guns we are most interested in here are under production in Italy.

Senator YOUNG. For this ship the guns will be made in Italy?

Admiral KING. No; the design stems from Italy. We plan to use an Americanized version in the production series of PHM, which will be built in this country.

LICENSING ARRANGEMENT WITH ITALIAN MANUFACTURER

Senator YOUNG. Are we buying their patents or paying them a royalty?

Admiral KING. It is a licensing arrangement. I don't have at hand the name of the company that is the American licensee.

Admiral PRICE. Otto Melara is the company in Italy that designed this gun. We have not decided yet on the company in the United States which will produce it. There will be a competition, then, to see which American company will produce the gun in this country. It will be an exact copy of the Italian gun and there is a licensing fee which will have to be paid. There would be a large research and development cost involved in trying to develop one from scratch in the United States.

DESTROYER TENDER

Senator YOUNG. The next item is the request for the construction of one destroyer tender at an estimated cost of $86.9 million. The ship data sheet will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

SERVICE: NAVY

Nomenclature: AD Destroyer Tender P–1 Line Item: 27; Popular Name: AD

Mission/Description.—To provide necessary material and shops for the calibration, test and overhaul of equipment and the accomplishment of repairs not requiring shipyard facilities, for all ocean escort and destroyer types including DLGN nuclear propulsion repair support.

COST DATA

[Dollars in millions]

	Fiscal year									
	1970 and prior amount	1971 amount	1972 amount	1973 amount	1974 amount	1975 amount	1976 amount	1977 amount	Cost to complete	Current estimate total program
Quantity					1					
Ship cost					86.9					86.9
Less advance procedure										
Net calendar year Progress					86.9					
Weapons systems cost					86.9					86.9
Outfitting/post delivery									3.7	3.7
R.D.T. & E										
Milcon										
Program acquisition cost										90.6
Average unit cost										90.6
Total additional cost										

Basic for FY 1973 Request.—Eleven destroyer tenders (AD) are in commission now. Of these eleven, 2 are now over 31 years old, 6 are 25–28 years old old and one is over 21 years old. SECNAV considers 35 years to be the mandatory retirement age for ADs. Four of the eleven ADs are the small, marginal AD 16/26 class. A minimum of nine ADs is required to maintain one AD each deployed to the MED and to WESTPAC and to provide a minimum of one AD in each major DD homeport. With the 35 year limit approaching on ADs 14 and 15, it is important to begin with a replacement program as soon as possible.

Test data

Equipment:	*Projected service approval date*
NATO SEA SPARROW	FY 1973.
AN/SPS–58	June 1972.

Procurement lead times have necessitated the obtaining of waivers to initiate procurement in advance of completion of service approval milestones. Release for final production is contingent upon incorporation of service approval evaluation results.

Contract data

Basic Construction.—To be determined.

Major Subsystems.—Boilers, Turbines and gears, Turbo Generators, NATO SEA SPARROW.

	Class	Item model, series, class, etc.
Characteristics:		AD Class:
Displacement full load	U	19,800 tons.
Length OA/beam extension	U	643′/85′.
Draft, Maximum Navigation	U	22′–1″.
Speed	U	18.
Shaft horsepower/number screws	U	20,000 HP/1.
Radars	U	AN/SPS–58 AN/SPS–55.
Sonars	U	AN/UQN ( ).
Guns	U	(2) .50-caliber machine guns.
Other ordnance	U	(2) MK–19 Grenade launcher; (1) NATO Sea Sparrow.

INVENTORY DATA

Name	Date commissioned	Current age
AD–14 Class:		
U.S.S. Dixie (AD–14)	April 1940	31
U.S.S. Prairie (AD–15)	August 1940	31
U.S.S. Piedmont (AD–17)	January 1944	27
U.S.S. Sierra (AD–18)	March 1944	27
U.S.S. Yosemite (AD–19)	May 1944	27
AD–16/26 Class:		
U.S.S. Cascade (AD–16)	March 1943	28
U.S.S. Shenandoah (AD–26)	August 1945	26
U.S.S. Yellowstone (AD–27)	January 1946	25
U.S.S. Bryce Canyon (AD–36)	September 1950	21
AD–37 Class:		
U.S.S. Samuel Gompers (AD–37)	July 1967	4
U.S.S. Puget Sound (AD–38)	April 1968	3

COST HISTORY COMPARISON

	Quantity	Millions of dollars
Initial planning estimate (development estimate):		
Procurement	1	$90.6
R.D.T. & E.		
Milcon.		
Total program costs		90.6
Current estimate total program (fiscal year 1972 budget submission):		
Procurement		NA
R.D.T. & E.		
Milcon.		
Total program costs		NA
Current estimate total program (fiscal year 1973 budget submission):		
Procurement		90.6
R.D.T. & E.		
Milcon.		
Total program costs		90.6

Admiral KING. Turning now to the destroyer, the destroyer tender (AD).

Of the 11 destroyer tenders now in service, only two are of post-World War II vintage. Eight of the remaining nine ships are over 25, including two over 30, and the remaining ship is 21 years old.

These ships are essential to the maintenance of a forward defense posture. The older tenders were designed and built to support relatively smaller destroyers which were much less sophisticated than our newer destroyers such as DD–963 and guided missile ships. The old tenders have been modified and updated; however, they are now only marginally capable of providing the required support. Also, the point has been reached where conditions of age and space limitations in the older tenders prohibit further modifications.

May I say here in addition to their mobility which permits us to support ships at our forward area, such as the Mediterranean and Western Pacific, these ships have tremendous value in our contential U.S. ports and Hawaii to provide that day-to-day support for the complex equipment in new ships as well as repair for all of the ships but, in particular, the older ones, of which we have far too many still in service.

The cost estimate for this ship is $86.9 million (TOA).

Senator YOUNG. While you refer to this as a destroyer tender, it is my understanding that it will be capable of supporting all of your

ocean escort and destroyer types, including the nuclear-powered guided missile frigate. Am I correct about this?

Admiral KING. Yes, sir.

Senator YOUNG. When was the last time we funded a new destroyer tender?

Admiral KING. The newest destroyer tender, U.S.S. *Puget Sound* (AD–38), was funded and authorized in fiscal year 1965 at a cost of $55.7 million.

Senator YOUNG. I want to emphasize a statement I note on page 2 of the ship data sheet, and I quote: "Eleven destroyer tenders are in commission now. Of these 11, two are now over 31 years old, six are 25 to 28 years old, and one is over 21 years old." What do you consider to be the useful life of a ship of this type?

Admiral KING. We consider that a destroyer tender can be used effectively for a period of between 25–30 years at the most, depending on whether or not the supported ships—that is, destroyer types—evolve with greatly changed systems.

Senator YOUNG. I note that this ship is to be equipped with the NATO Sea Sparrow defense system. Comment briefly on the capabilities of this system.

Admiral KING. The NATO Sea Sparrow surface missile system will be capable of acquiring and tracking small, high speed air targets [deleted] and intercepting these targets [deleted].

Senator YOUNG. I note that this proposed ship will have a displacement of 19,800 tons. How does that compare to the displacement of the tenders now in the fleet?

Admiral KING. The proposed ship will be the third ship of the 19,800-ton *Gompers* class. It will be larger than the current *Dixie*, *Cascade* and *Shenandoah* class destroyer tenders which have a full load displacement of 18,000 tons, 14,998 tons, and 14,700 tons respectively.

Senator YOUNG. I note on page 3 of the ship data sheet that the AD–14 class tenders are all 27 to 31 years of age, and that the AD–16/26 class tenders vary in age from 21 to 28 years. Just what are the capabilities of these old ships to support the modern ships like the nuclear powered guided missile frigate and the new destroyers—the DD–963s—that you expect to come into the inventory shortly?

Admiral KING. The old destroyer tenders are becoming less and less capable of providing support to the new combatant surface ships that are either in service now or are planned for introduction in the future. They lack the shop space, equipment, and utilities to respond effectively to increasingly complex support demands. For example, the old tenders have only a third of the shop space of the proposed tenders, hence they are limited in both the nature and quantity of their output. They cannot provide services such as nuclear propulsion support

and guided missile systems repair. They are also limited in their ability to support sophisticated torpedoes, ammunition, and special test equipment. Above all else, they are limited in their ability to provide utilities to enable the ships alongside to secure their engineering plants. In the latter instance, the old tender can provide electric service to support only one or two of the new ships alongside whereas the proposed tender could support five or six.

Senator YOUNG. I note that you plan to have two 50-caliber machineguns on this ship. I recall that the *Pueblo* was equipped with 50-caliber machineguns that weren't much use when the ship got into trouble. Just what is the basis for equipping this ship with these small guns?

Admiral KING. Sir, since preparation of the data sheet in support of this budget request we have completed a study of armament for the various types of tenders. The guns that are now planned for this ship are two 20mm machineguns. They will provide a measure of self-defense. These machineguns will supplement the other weapon systems which this ship will carry—the improved point defense surface missile system, two close in weapon systems, and two grenade launchers. These weapons in the aggregate will provide for anti-ship missile defense and close-in harbor protection against surface craft.

SUBMARINE TENDER

Senator YOUNG. If there are no further questions or comments on the destroyer tender, we will proceed with the consideration of the next item which is a request for the construction of one submarine tender at a total estimated cost of $79.9 million. The ship data sheet will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

SERVICE: NAVY

Nomenclature: Tender, Submarine; P–1 line item No. 29; popular name: AS–38 class

Mission/Description.—The submarine tender provides mobile base facilities capable of furnishing maintenance and logistic support for nuclear attack submarines, including SSN–668 class, operating from advance sites. [Deleted] SSN's can be fully supported with up to four SSNs simultaneously receiving complete alongside services. Shops, material, and technical assistance are provided for modification and repair of submarines not requiring the facilities of a shipyard. Logistic support includes: stocking and issuing submarine supplies, provisions, and repair parts; stocking, maintaining, and issuing submarine weapons and evasion devices; and furnishing medical and dental services for personnel of ships tended. In addition, the submarine tender provides command and control facilities as well as work and habitability spaces for embarked submarine staff personnel.

COST DATA

[Dollars in millions]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate, total program
Quantity	1		1	1	1				1	6
Ship cost	113.9		93.0	79.9	120.0				120.0	526.8
Less advance procurement			—.1	—15.0						
Net calendar year program			92.9	64.9	120.0					
Advance procurement, calendar year		.1	15.0							
Weapons systems cost/1	113.9	.1	107.9	64.9	120.0					526.8
Outfitting/post delivery					.3	2.8	0.9		7.1	11.1
Program acquisition cost/2										537.9
Average unit cost/3										89.7
Total additional cost										None

[1] Beginning of new class designated AS–38 class.

Basis for FY 1973 Request.—New construction submarine tenders are urgently required to replace present AS–11 class ships which were designed and built during World War II to support diesel powered submarines. Despite extensive conversions, AS–11 class tenders possess a marginal support capability for modern SSNs and almost no capability for the SSN–688 class now under construction. The point has been reached where age and space limitations prohibit further modification of the AS–11 class. Procurement of the FY 73 new construction tender will result in the replacement of a 31 year old ship. [Deleted.]

Test Data:	*Service approval date*
NATO Sea Sparrow missile system	Fiscal year 1973.
AN/SPS–58 radar	June 1972.

The projected dates of service approval for these items support the AS–38 class program. Procurement lead times may necessitate obtaining waivers to initiate procurement in advance of service approval. In such cases release for final production is contingent upon incorporation of service approval evaluation results.

Contract Data

Basic Construction.—AS–36 and AS–37—Last contract type was firm fixed price (FFP) at General Dynamics, Quincy Division. New contract to be determined. Planned for private yard.

Major Subsystems.—Boilers—To be determined. Turbine and gear—To be determined. Turbo Generators—To be determined.

CHARACTERISTICS

	Class	Item model, series, class, etc.
Displacement full load	U	24,000 tons.
Length overall/beam extension	U	643 feet 8 inches/85 feet.
Draft, maximum navigation	U	28.5 feet.
Speed	U	18 knots sustained at full load displacement.
Shaft HP/number of screws	U	20,000 HP/1 screw.
Radars	U	Surface search (1) AN/SPS–55.
	U	Air search (1) AN/SPS–58.
Sonar	U	Echo sounder (1) AN/UQN.
Guns	U	4 20mm. machine gun single mounts. 2 40mm. machinegun grenade launcher single mounts.
Other ordnance	U	1 NATO Sea Sparrow missile system (1 8-cell launcher with missiles and 8 missiles reloads).
		1 close-in weapoms system (space and weight).

INVENTORY DATA—FISCAL YEAR 1973

Ship	Commissioned	Age
Fulton (AS–11)	September 1941	31
Sperry (AS–12)	May 1942	31
Orion (AS–18)	September 1943	29
Gilmore (AS–16)	May 1944	29
L. Y. Spear (AS–16)	February 1970	3
Dixon (AS–37)	July 1971	1

Cost history comparison

Initial planning estimate: Procurement	526.2
Current estimate total program (fiscal year 1972 budget submission): Procurement	526.2
Current estimate total program (fiscal year 1972 budget submission):	
Procurement	537.9
R.D.T. & E	0
MILCON	0
Total program costs	537.9

Explanation of cost difference between fiscal year 1972 and fiscal year 1973: Cost increase is attributed to increased costs due to economic factors and the requirement for improved habitability and pollution abatement standards.

Admiral KING. We requested two submarine tenders in the fiscal year 1972 budget request. This was reduced by the Congress to one ship and provision of advance funding for the second in the amount of $15 million.

The same reasoning for the requirement to replace our older destroyer tenders applies to our need for new submarine tenders. The need for these new ships is emphasized by the growing number of the larger relatively complex nuclear attack submarines entering the fleet each year. Our cost estimate for this ship is $79.9 million. The total obligational authority requested is $64.9 million.

Senator YOUNG. The difference between the total estimated cost of the $79.9 million for the construction of this ship and your request for $64.9 million is the $15 million advance procurement provided in fiscal year 1972. Is this correct?

Admiral KING. That is correct, sir.

Senator YOUNG. I assume that this ship will be fully capable of supporting the new SSN–688 nuclear attack submarine. It is my understanding that you now have six submarine tenders in the fleet. What are the ages of these ships?

Admiral KING. The submarine tenders funded in fiscal years 1972 and 1973 will be capable of furnishing full maintenance and logistic support for all nuclear attack submarines, including the SSN–688 class. During fiscal year 1973, the ages of the tenders in the fleet will be as follows: *Fulton* (AS–11), 31 years; *Sperry* (AS–12), 31 years; *Gilmore* (AS–16), 29 years; *Orion* (AS–18), 29 years; *L. Y. Spear* (AS–36), 3 years; and *Dixon* (AS–37), 1.

Senator YOUNG. With respect to these four ships that are anywhere from 29 to 31 years old, are they fully capable of supporting your nuclear attack submarines?

Admiral KING. The four old tenders of the AS–11 class were designed and built during World War II to support diesel powered submarines. These tenders have been extensively modified to enable them to support nuclear powered attack submarines also. Despite the nuclear support conversion, AS–11 class tenders currently possess a marginal capability for modern SSN's and almost no capability for the SSN–688 class now under construction. The point has been reached where age and space limitations prohibit further modification of the AS–11 class.

Senator YOUNG. With the currently planned force of nuclear attack submarines, just how many of these submarine tenders will you require?

Admiral KING. We will require a force level of six submarine tenders designed and built to support nuclear attack submarines.

Senator YOUNG. As I recall, the submarine tender funded in fiscal year 1972 was the beginning of a new class of tenders. Am I correct?

Admiral KING. You are correct, sir.

RESCUE AND SALVAGE SHIP

Senator YOUNG. The next item is the request of $53.1 million for the construction of two rescue and salvage ships. The ship data sheet will be included in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

SERVICE: NAVY

Nomenclature: Salvage and Rescue Ship; P–1 Line Item: 31; Popular Name: ATS

Mission/Description.—As a unit of the Mobile Logistic Support Forces, to provide salvage, repair, diving and rescue service to the fleet and to take in tow ships of the fleet which are battle damaged or non-operational.

COST DATA

[Dollar amounts in millions]

	Fiscal year—								Cost to complete	Current estimate total program
	1970 and prior	1971	1972	1973	1974	1975	1976	1977		
Quantity	3		1	2						6
Ship cost	$36.7		$30.4	$53.1						$120.2
Less advance procurement			.1							.1
Net calendar year progress	36.7		30.3	53.1						120.1
Advance procurement, calendar year		.1								.1
Weapons systems cost	36.7	.1	30.3	53.1						120.2
Outfitting/post delivery										
Delivery	.2	1.6	1.2	.5	1.2	1.7				6.4
R.D.T. & E.										
Milcon										
Program acquisition cost										126.6
Average unit cost										21.1
Total additional cost										

Basis for FY 1973 Request.—The two ATSs requested in FY 1973 are required to upgrade the fleet salvage, rescue, towing and diving capability. They will replace two old, World War II vintage, ships. The ATS is designed to mount portable equipment (while at pier side) to support deep diving operations to a depth of 850 feet; a heavy bow lift of 150 tons dynamic lift and 300 tons tidal lift; and a compressed air capability to blow tanks at depths of 850 feet. It is not feasible to upgrade the old ships to meet current fleet requirements. The ATS increases the Navy's capability to tow large new ships of the fleet. Many repair parts for older ships are becoming critical as they are no longer available through normal supply channels and must be purchased or manufactured on a case by case basis.

Test Data: None.

Contract Data

Basic construction: Private Shipyard (FFP).

Major Subsystem:

Diesel Engines and Gears—MK I Mod I Deep Dive System.
Controllable Pitch Propellers—Sewage Treatment Facilities.
Towing Machine—Capstans and Winches.

CHARACTERISTICS

	Class	Item model, series, class, etc.
Displacement full load	U	3,117 tons.
Length overall /beam extension	U	282 feet 8 inches/50 feet.
Draft, maximum navigation	U	15 feet 2 inches.
Speed		16 knots.
Shaft HP/number of screws	U	6,000/2.
Radars	U	AN/SPS 51 or 53.
Sonars	U	Commercial sea scanner.
Guns	U	2—20mm., 4—.50 caliber machineguns.
Other ordnance	U	None.

Inventory Data.—The following table, based on currently planned force levels, shows those salvage and towing ships projected through FY 1977.

Type	Fiscal year— 1972	1973	1974	1975	1976	1977
ARS	12	12	[Deleted]	[Deleted]	[Deleted]	[Deleted]
ATF	24	24	[Deleted]	[Deleted]	[Deleted]	[Deleted]
ATS	2	3	[Deleted]	[Deleted]	[Deleted]	[Deleted]
Total	38	38	[Deleted]	[Deleted]	[Deleted]	[Deleted]

Note: All ARS and ATF will be between 27 and 31 years old in fiscal year 1973.

Cost history comparison

Initial planning estimate:		
Procurement	131.6	
R.D.T. & E	0	
Milcon	0	
Total program costs		131.6
Current estimate total program (fiscal year 1972 budget submission):		
Procurement	131.6	
R.D.T. & E	0	
Milcon	0	
Total program costs		131.6

Current estimate total (fiscal year 1973 budget submission):

Procurement	126.6
R.D.T. & E	0
Milcon	0
Total program costs	126.6

Differences between fiscal year 1972 and fiscal year 1973 are because of refined price estimates.

Admiral KING. These ships are being requested to replace badly needed, over-aged ships that have passed economical and reliable operating condition. These ships combine the functions of salvage and rescue in one hull.

Congress authorized and funded one ATS last year. Included in the cost of these ships are funds to procure one set of heavy lift devices and one high pressure submarine air-blowing plant per ship. These subsystems will be air transportable and capable of being utilized on board the four other ships in the class which have been authorized.

Senator YOUNG. I note that your current program calls for six of these ships, and as I read the data sheet, the two you are requesting in fiscal year 1973 will fulfill this requirement. Is this correct?

Admiral KING. That is correct. This will provide three of this class of ship to the U.S. Atlantic Fleet and three to the U.S. Pacific Fleet.

Senator YOUNG. I note that two of these ships were funded in fiscal year 1970 and prior years, and one was funded in fiscal year 1972. Have any of these ships joined the fleet, and when will the rest join the fleet?

Admiral KING. Three of these ships were funded in fiscal year 1970 and prior fiscal years. Two have joined the fleet and a third will be delivered in September 1972. The ship funded in fiscal year 1972 is scheduled for delivery in fiscal year 1975 and the two requested in fiscal year 1973 would normally be expected to be delivered in fiscal year 1976.

Senator YOUNG. How large a crew do you have on this ship?

Admiral KING. The crew of the salvage and rescue ship consists of seven officers and 86 enlisted.

Senator YOUNG. Do you carry any guns on this type ship, and if so, how many and what are their size?

Admiral KING. The armament of these ships is two twin 20mm gun mounts and four 50-caliber machineguns.

Senator YOUNG. Generally speaking, how does this ship differ from the salvage ships designated ARS and ATF?

Admiral KING. The salvage and rescue ship (ATS) is a larger and more capable ship than either the salvage ship (ARS) or the fleet ocean tug (ATF). Some basic characteristics are provided for comparison purposes as follows:

	ATS	ARS	ATF
Displacement full load	3,117 tons	2,045 tons	1,640 tons.
Length overall	282 feet 8 inches	213 feet	205 feet.
Beam extreme	50 feet	43 feet	39 feet.
Number of shafts	2	2	1.
Shaft horsepower	6,000	3,060	3,000.
Draft (maximum nav.)	15 feet 2 inches	15 feet	17 feet.

Additionally, the ATS is designed to mount the portable deep diving system while at pier side to support diving operations to a depth of 850 feet; a heavy bow lift of 150 tons dynamic lift and 300 tons tidal lift; and a compressed air capability to blow tanks at depths of 850 feet. The ARS and ATF can support diving operations to depths of 300 feet but do not have the heavy lift capability. The largest boom on each type is 10 tons. The ARS can provide compressed air to blow tanks up to 300 feet depths and the ATF does not have this capability.

SERVICE CRAFT

Senator YOUNG. The next request is in the amount of $13 million for service craft.

You may proceed, Admiral King.

Admiral KING. Our request for service craft this year is for $13 million. We plan to procure four large harbor tugs (YTB), four medium harbor tugs (YTM), and five non-self-propelled fuel oil barges.

The Navy maintains various types of service craft numbering about 1,500. These units perform essential day-to-day functions of general fleet support including antipollution services. Our older, World War II vintage craft should be replaced on a regular basis to reduce repair and operating costs. About 85 percent of our service craft fleet is over age 25.

I would like to add here, Mr. Chairman, that the modest numbers that we have on replacement this year will not keep pace with the desired rate of replacement.

Senator YOUNG. Of the total requested for service craft, $2.3 million is for five fuel oil barges. Please describe this craft, and comment on your need for the five you are requesting funds for.

Admiral KING. The five fuel oil barges are non-self-propelled craft having a capacity of 8,000 barrels of petroleum products—335,000 gallons. The barges will be used to replace craft constructed during World War II. Any craft that are so replaced that have any useful life remaining will be repaired and placed in service as sludge/sewage barges.

Senator YOUNG. The request for service craft includes approximately $5 million for four large harbor tugs. Please describe this craft and cite several examples of its uses and comment on your need for the four you are requesting.

Admiral KING. The four large harbor tugs have 2,000-horsepower engines that permit the use of fewer tugs to assist in docking our larger ships. One hundred and one of the 125 medium harbor tugs in service were constructed during World War II and are rapidly reaching the end of their useful life. The large harbor tugs are replacing the medium harbor tugs at the rate of three retirements for each two new large harbor tugs.

Senator YOUNG. $5.7 million is included in the total request of $13 million for the procurement of four medium harbor tugs. Please describe this craft and comment on your need for the four you are requesting.

Admiral KING. The medium harbor tugs represent an investment in modern technology in that the tugs will have the vertical axis propul-

sion system—cycloidal— that permits the tug to apply the force of its engines in exactly the desired direction, thereby increasing the efficiency of the craft as well as its capability to operate in a restricted area. The tugs will have a greater capability than the 2,000-horsepower large harbor tug because of its flexibility, but will cost slightly more than the commonly accepted configuration.

OUTFITTING AND POST DELIVERY

Admiral KING. We are requesting $43.8 million for outfitting ships in prior year programs which are nearing completion and $35.4 million for post-delivery funds. Outfitting material includes the initial supply of consumables and repair parts needed for each new ship. Post delivery costs are those associated with work required to correct construction deficiencies defined during acceptance trials or during the shakedown period which can be accomplished within 11 months following the ship's fitting out period.

Senator YOUNG. With respect to the request of $38.8 million for outfitting material please provide a tabulation for the record listing each of the ships included in this request, the year of their initial funding, and the amount included for each of the ships.

Admiral KING. The information you requested is contained in a table I will include in the record.

(The information follows:)

SCN OUTFITTING COST, FISCAL YEAR 1973

[Dollars in thousands]

Ship	Program year	Outfitting cost
SSBN-643	1971	$234
SSBN-644	1971	234
SSBN-642	1972	339
SSBN-645	1972	339
SSBN-654	1972	474
SSBN-655	1972	712
SSBN-656	1972	699
SSBN-657	1972	673
SSBN-658	1973	424
SSBN-659	1973	424
SSBN-616	1973	105
SSBN-617	1973	105
SSBN-619	1973	105
AS-31	1973	105
Total		4,972
CVAN-68	1967	2,500
Total		2,500
LHA-1	1969	2,000
LHA-2, 3	1970	1,800
LHA-4, 5	1971	900
Total		4,700
DLG-9	1971	270
DLG-19	1971	90
DLG-20	1971	260
DLG-23	1971	750
DLG-12	1972	1,330
DLG-13	1972	510
DLGN-36	1967	1,500
DLGN-37	1968	1,990
Total		6,700

SCN OUTFITTING COST, FISCAL YEAR 1973—Continued

[Dollars in thousands]

Ship	Program year	Outfitting cost
DE-1065	1965	100
DE-1069	1965	200
DE-1073	1965	100
DE-1083	1966	100
DE-1084	1966	50
DE-1085	1966	100
DE-1086	1966	100
DE-1087	1966	100
DE-1088	1967	200
DE-1089	1967	700
DE-1090	1967	700
DE-1091	1967	700
DE-1092	1967	1,200
DE-1093	1967	1,250
DE-1094	1967	1,250
DE-1095	1967	955
DE-1096	1967	800
DE-1097	1967	800
Total		9,405
SSN-665	1965	40
SSN-677	1966	175
SSN-678	1967	95
SSN-679	1967	150
SSN-680	1967	485
SSN-681	1967	435
SSN-682	1967	1,235
SSN-683	1968	790
SSN-684	1968	585
SSN-686	1969	945
SSN-687	1969	605
SSN-688	1970	1,500
SSN-689	1970	900
SSN-690	1970	800
Total		8,740
AE-33	1967	100
AE-34	1968	250
AE-35	1968	400
AOR-6	1967	650
Total		1,400
LST-1195	1967	100
LST-1196	1967	150
LST-1197	1967	200
LST-1198	1967	300
LSD-39	1966	50
LSD-40	1967	200
Total		1,000
DD-963	1970	710
DD-964	1970	710
DD-965	1970	710
Total		2,130
ASR-21	1967	340
ATS-2	1968	30
ATS-3	1968	20
ASR-22	1968	340
MSO-437	1969	40
MSO-438	1969	20
MSO-448	1969	30
MSO-488	1969	30
MSO-490	1969	30
AGOR-21	1971	60
AGOR-22	1971	60
AGS	1972	110
Service craft	1969–1972	120
Total		1,230
Transportation		1,000
Grand total		43,777
Minus strategic outfitting total		4,972
General purpose outfitting total		38,805

Post Delivery Charges

Senator Young. Please provide a comparable tabulation with respect to the request for $30 million for post-delivery charges.

Admiral King. I will do that.

(The information follows:)

SCN POST-DELIVERY COSTS, FISCAL YEAR 1973

[Dollars in thousands]

Ship	Program year	Post-delivery costs
SSBN-643	1971	632
SSBN-644	1971	632
SSBN-642	1972	632
SSBN-645	1972	632
SSBN-654	1972	632
SSBN-656	1972	632
SSBN-655	1972	632
SSBN-657	1972	632
Total		5,056
DLG-12	1972	3,100
DLG-23	1971	2,500
DLGN-36	1967	2,800
Total		8,400
DE-1073	1965	1,900
DE-1088	1967	1,800
DE-1089	1967	1,800
DE-1090	1967	1,800
DE-1091	1967	1,800
DE-1092	1967	1,800
DE-1093	1967	1,900
Total		12,800
SSN-665	1965	1,300
SSN-677	1966	1,300
SSN-678	1967	700
SSN-679	1967	700
SSN-681	1967	700
Total		4,700
ATS-3	1967	400
ASR-22	1968	500
AGOR-7101	1970	74
AGOR-7102	1970	75
Service craft		140
Total		1,189
AE-34	1968	1,120
AE-35	1968	1,120
AOR-6	1967	1,020
Total		3,260
Grand total		35,405
Minus strategic post-delivery total		5,056
General purpose post-delivery total		30,349

Funds Deferred From Prior Years

Admiral King. In the fiscal year 1972 budget, certain funds which we had requested for cost growth, escalation shortages and funds required for completion of prior-year programs were deferred as not being required in the fiscal year 1972. Therefore, this budget requests funds which we require to complete existing programs. These funds

include: $37.5 million of prior-year funds rescinded in the fiscal year 1971 budget and deferred from the fiscal year 1972 budget request.

Senator YOUNG. With respect to this $37.5 million required for the completion of prior-year programs, do you expect to obligate all of these funds during fiscal year 1973?

Admiral KING. Yes.

Senator YOUNG. Please provide the committee with a detailed list of the ships that are included in this request for $37.5 million.

Admiral KING. The information you desire is contained in a table that I will place in the record. However, it should be noted that this is a request for funds which were originally requested in fiscal year 1972 and deferred by the Congress.

(The information follows:)

FUNDS FOR COMPLETION OF PRIOR-YEAR PROGRAMS—FISCAL YEAR 1973

[In millions of dollars]

Program year	Ship program	Amount
1965	DE 1052	$1.6
1966	DE 1052	1.5
1967	DE 1052	18.8
1967	DLGN	3.2
1967	SSN	12.4
Total		37.5

Admiral KING. $110.9 million for cost growth in the fiscal year 1971 and prior years program which were deferred from our fiscal year 1972 budget request.

None of these funds are for claims. The funds for prior-year cost growth do not include any additional or new cost growth over last year's estimate.

Senator YOUNG. With respect to the $110.9 million requested for cost growth, do you expect to obligate this full amount during fiscal year 1973?

Admiral KING. Yes.

Senator YOUNG. Please provide for the record a tabulation listing each of the ship programs included in this request for $110.9 million, indicate the year of the original funding and the amount included for each of these ship programs.

Admiral KING. I have a table containing the information you desire. The amounts requested for cost growth were originally a part of fiscal year 1972 budget request. The amounts indicated below were deferred by Congress. There are no additions to the original request submitted in fiscal year 1972.

(The information follows:)

COST GROWTH COSTS—FISCAL YEAR 1973

[In millions of dollars]

Program year and ship program	Cause of cost growth	Amount of cost growth
1967: CVAN	Escalation	5.0
1970: CVAN	do	58.4
1967: DE 1052	do	3.0
Total escalation		66.4
1967: CVAN	Price increases	27.8
Total price increases		27.8
1968: SSN 637	Recoupment objective	6.2
1969: SSN 637	do	10.5
Total recoupment objective		16.7
Total cost growth		110.9

Admiral KING. Combining our request for outfitting, post-delivery, and completion of prior-year programs, we are requesting a total of $227.6 million for those items.

ADVANCE PROCUREMENT

Funds amounting to $952.4 million are being requested for advance procurement of long-leadtime effort and equipment for future program ships.

Due to the need to initiate two particularly large new programs this year, the total requested is higher than has been the case in past years.

UNDERSEA LONG-RANGE MISSILE SYSTEMS (ULMS)

Senator YOUNG. Admiral, before you proceed with your discussion of the ULMS program, I want to include the ship data sheet in the record at this point.

(The information follows:)

PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

SERVICE: NAVY

Nomenclature: Submarine ULMS; P–1 Line Item: 7; Popular Name: ULMS

Mission/Description.—To provide an undersea strategic missile system in order to ensure that the U.S. continues to maintain a credible, survivable deterrent independent of foreseeable threats. The ULM system is comprised of a CONUS based nuclear submarine equipped with long range strategic ballistic missiles.

Cost Data.—Based on January 1972 Five Year Defense Program (FYDP) in escalated dollars ($ Millions). The escalation is based on latest OSD developed escalation factors. The FY 74–77 estimates are class F (rough order of magnitude) estimates.

COST DATA

Dollar amounts in millions[

	Fiscal year—						Cost to complete	Current, estimates total program, fiscal year 1972–77
	1972 [1]	1973	1974	1975	1976	1977		
Quantity							[2]	
Ship cost								
Less advance procurement								
Net callendar year program								
Advance procurement, calendar year		361.0						
Weapons systems cost		361.0	[Deleted]					[Deleted]
Outfitting/post delivery [3]								
Milcon [4]	0	27.3						
R.D.T. & E.[5]	79.8	190.4						
Ship acquisition costs	79.8	578.7						
Average unit cost: lead ship–follow ships [6]		[Deleted]						
Additional costs [4]	0	23.5	159.9	138.7	158.8	53.8		534.7

[1] Includes $35,000,000 in the President's supplemental budget request.
[2] To be determined. Force levels have not been determined by SECDEF.
[3] Outfitting and post delivery costs will be programed after fiscal year 1977.
[4] Supports total ULMS weapon system, both submarine and missile.
[5] R.D.T. & E. directly supporting ULMS submarine.
[6] Average unit cost based on SCN cost.

Basis for FY 73 Requests.—The latest approved DOD Five Year Defense Program contains the funding profile for the acquisition of [deleted] ULMS submarines through FY 77 with lead ship full funding in [deleted] followed by [deleted] ships per year thereafter. The ULMS submarine is to be capable of launching an initial missile (C–4) of about [deleted] range and longer range missile (D–5) to be developed later. ULMS is required to improve the sea-based missile forces in a manner which will make them relatively invulnerable to a broad spectrum of potential future threats and to give them the capability of penetrating Soviet defense postures and provides a highly survivable replacement for POLARIS/POSEIDON. Funding in FY 1973 is required to perform ship design effort for the lead ULMS submarine, planned for inclusion in the [deleted] military authorization request and to procure critical long leadtime ship components for the lead and [deleted] follow ships.

Test Data.—To be determined.

Contract Data.—Ship procurement not initiated.

MAJOR SUBSYSTEMS: STRATEGIC WEAPON SYSTEM; COMMAND AND CONTROL SYSTEM; PROPULSION SYSTEM

Characteristics	Class	
Submarine:		
Maximum speed (knots submerged)	C	[Deleted].
Endurance:		
1. Range	C	
2. Stores (Days)	C	
Armament:		
1. Missile tubes	C	
2. Torpedo tubes	C	
Overall length (feet)	U	To be determined.
Beam, maximum (hull diameter in feet)	C	[Deleted].
Draft navigational	U	To be determined.
Submerged displacement (tons)	U	Do.
Propulsion:		
1. Type	U	Nuclear.
2. Shaft horsepower	C	[Deleted].
Accommodations, crew	U	To be determined.

INVENTORY DATA: FORCE LEVELS HAVE NOT BEEN ESTABLISHED BY SECDEF—PRODUCTION DATA (BASED ON JAN. 1972 FYDP FOR FY 74–77)

COST HISTORY COMPARISON

	Quantity	Dollars (millions)
Initial planning estimate (development estimate):		
Procurement		
R.D.T. & E		
Total program cost	(1)	(2)
Current estimate total program (fiscal year 1973 budget submission):		
Procurement		
R.D.T. & E		
Total program cost	(1)	(2)

1 To be determined.
2 See note 5 on page 1.

Admiral KING. We are requesting $361 million in fiscal year 1973 for the undersea long-range missile system program to provide ship design effort for the lead ULMS submarine planned for inclusion in our fiscal year 1974 authorization request and to procure critical long lead ship components.

Senator YOUNG. How much of the $361 million is for ship design effort and how much for procurement of long leadtime components, and what are those components?

Admiral KING. [Deleted] dollars, Senator, of the $361 million, is required as soon as possible in the first quarter of fiscal year 1973 to procure long leadtime nuclear propulsion plant equipment. [Deleted] dollars is required for engine room components related to the nuclear propulsion plant. [Deleted] dollars is needed to procure detailed designs for the lead ship and for integration of weapons system interfaces with ship systems.

Senator YOUNG. This is all a part of the ULMS program?

Admiral KING. Yes, sir; this is all in the ULMS program. [Deleted] dollars is required for advance procurement of hull steel, the material to make the hull of the ship for which we required deliveries in 1974.

Senator YOUNG. Proceed.

SOVIET MISSILE PROGRAMS

Admiral KING. The Soviet sea launched ballistic-missile program continues at such a rate that they will not only reach parity in numbers with the United States but are now expected to exceed the number of U.S. ballistic-missile submarines. In addition, the Soviet Union is directing a considerable amount of resources toward increasing their ASW capabilities and land-based ICBM forces. We consider our 41 existing fleet ballistic missile submarines to be adequate in number and modernity for the time being. But, by the late 1970's, the age of these systems must be considered. It would be unwise to assume that the offensive technology represented by our present ships will remain adequate against the potential threat of the 1980's when the first of our Polaris/Poseidon submarines becomes 20 years old.

The request for funds for the ULMS program is based on a recent decision to emphasize the program in an effort to maintain our strategic position vis-a-vis the Soviet Union.

Senator YOUNG. I assume that this request is based on the implementation of the December 1971 acceleration decision. Am I correct about this?

Admiral KING. Yes, sir, you are correct. As noted in the data sheet, the fiscal years 1974–77 estimates are higher than those in the January 1972 Five Year Defense Plan (FYDP) because the FYDP estimates were based on a [deleted] missile tube ship vice the 24 missile tube ship. I should also point out that the $35 million shown in the footnote under fiscal year 1972 R.D.T. & E., N. which was in the President's supplemental budget request has now been added to the fiscal year 1973 budget addendum.

Senator YOUNG. What is the initial operational capability date for the first ULMS submarine under the December 1971 acceleration decision?

Admiral KING. As a result of the December 1971 acceleration decision, an IOC of 1978 for the ULMS submarine, that is, total system was established.

Senator YOUNG. What was the initial operational capability for the first ULMS submarine under the schedule submitted in support of the budget for fiscal year 1972?

Admiral KING. At the time of the fiscal year 1972 budget submission the program was based on system development, that is, a submarine and missile, without the requirement for a backfit capability. The IOC was established as the earliest date the system could be deployed within the funding available during the program period; with this constraint, the ULMS submarine and ULMS missile IOC became late fiscal year [deleted].

Senator YOUNG. How much of this $361 million would be required to maintain the 1972 budget IOC date for the first ULMS submarine?

Admiral KING. The fiscal year 1973 funding requirements to maintain this IOC date did not include any SCN funds, only R.D.T. & E., N. Included in the R.D.T. & E., N. was [deleted] for a propulsion plant development prototype capable of being installed on the lead ULMS submarine. This [deleted] could be SCN funded rather than R.D.T. & E., N.

Senator YOUNG. What was the IOC date for the first ULMS submarine under the Packard decision of September 1971?

Admiral KING. The Packard, September 1971 decision stated that: "The objective of the ULMS program should be to bring in a new force of reasonable cost in the early 1980's."

Senator YOUNG. How much of this $361 million would be required to meet this schedule?

Admiral KING. The fiscal year 1973 funding requirement for this decision was only OPN and R.D.T. & E., N. with no particular funds for prototype development included.

CVN–70

Senator YOUNG. The next item to be considered is the request of $299 million for the CVN–70. The ship data sheet will appear in the record at this point.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

SERVICE: NAVY

Nomenclature: Carrier, Aircraft, Nuclear; P–1 LINE ITEM: 8; POPULAR NAME: CVN–70

Mission/Description.—To operate aircraft and engage in attacks on targets at sea and ashore.

COST DATA

[Dollars in millions]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	1975	1976	1977	Cost to complete	Current estimate, total program
Quantity	2	0	0	0	1	0	0	0	0	3
Ship cost	$1,100.4	0	$100.6	$91.2	$951.0	0	0	0	0	$2,243.2
Less advance procurement	134.8	0	0	0	299.0	0	0	0	0	433.8
Net current year program	965.6	0	100.6	91.2	652.0	0	0	0	0	1,809.4
Advance procurement current year	134.8	0	0	299.0	0	0	0	0	0	433.8
Weapons systems cost	1,100.4	0	100.6	390.2	652.0	0	0	0	0	2,243.2
Nuclear spares	[1] 87.3	[1] 20.7	0	0	0	0	0	0	0	108.0
Delivery	0	0	2.3	2.5	11.2	$8.0	0	$0.5	$15.5	40.0
R.D.T. & E.										
MILCON										
Program acquisition cost	1,187.7	20.7	102.9	392.7	663.2	8.0	0	.5	15.5	2,391.2
Average unit cost										797.0

[1] Nuclear spares not included in SAR.

Basis for fiscal year 1973 requests

Funds of $299.0 million are required by the Navy in FY 1973 for procurement of long lead time propulsion plant components for the third nuclear powered *Nimitz* class aircraft carrier, CVN–70, in order to permit delivery in 1980 to replace an overage World War II design carrier. The Navy considers these advance procurement funds for the CVN–70 to be the highest priority item in the FY 1973 Navy budget request.

In 1966, the Secretary of Defense approved construction of three nuclear powered carriers after a series of analytical studies which projected a continuing need for sea-based tactical air power. The first two ships of the class, *Nimitz* and *Dwight D. Eisenhower*, are under construction and are scheduled to be delivered in 1973 and 1975 respectively.

Present and foreseeable national strategy, erosion of our overseas base rights, the increasing Soviet naval threat and the obsolescence of our oldest carriers reconfirm the need to proceed without further delay with construction of the third ship of this class, the CVN–70.

For the first time in the quarter century since the end of World War II, the United States is facing a naval threat which challenges our free use of the seas. Failure on our part to provide general purpose naval forces which can successfully counter this threat from the developing Soviet naval forces could lead to the United States having to give in on vital issues for which we are not willing to go to nuclear war.

Our overseas allies depend upon our support which must come by sea. There is no valid plan for overseas military operation of the Army, Air Force or amphibious forces with embarked Marines that does not depend on our free use of the seas (For example 96% of all supplies we have sent to Indochina have been carried by ships). Additionally, the capability of the United States to fight for an extended period in defense of its territory or other areas of interest is dependent on our ability to maintain the flow of materials over the seas. The sheer bulk of the daily use of oil alone for military and industrial needs precludes stockpiling quantities for more than short-term needs.

Sea-based and land-based tactical aircraft are essential to sustain our general purpose and logistic support forces against an enemy as well as to provide support for our forces in any of the areas of the world where we must be prepared to fight. Land-based tactical aircraft can be employed when their land bases have been adequately prepared, provisioned and defended, when they are located within range of the area of conflict, and when, if they are on foreign soil, the terms of the base agreement permit their use. Sea-based tactical aircraft are required when land-based tactical aircraft cannot be employed failing any of the above. The trend in the decrease in the number of overseas bases available for the unrestricted use of United States military aircraft requires increasing reliance on sea-based aircraft. Without aircraft carriers with their ability to quickly concentrate this sea-based tactical power and to maintain the use of the seas all our other forces would become critical vulnerable.

For all levels of military action other than all-out nuclear war—from a show of force to general war—*the aircraft carrier is the primary striking force of our Navy. It provides the offensive power necessary to assure free use of the seas and the air over the seas in support of our national objectives.* The nuclear powered aircraft carrier task groups has greater capability to penetrate and counter the Soviet naval threat than any other naval surface force we know how to build.

The United States is continuously reassessing all of its defense needs including the number of carriers that will be required in future years. Regardless of any change that may be made in the carrier force level in the next decade it is necessary to proceed now with procurement of long lead items for the CVN–70 as it is required to replace an old World War II carrier. Further, if a smaller carrier force level is decided upon in the future, it will be even more important that each remaining carrier be the most capable, least vulnerable ship it is possible to build. The nuclear powered aircraft carrier *is the least vulnerable, most powerful surface warship ever built.*

For the reasons cited above and in order to continue modernization of the Navy's carrier force, including increased use of nuclear propulsion in the fleet of the 1980's and beyond, the President has included in his FY 1973 budget $299.0M primarily for procurement of long lead time propulsion plant components leading to delivery of the CVN–70 in 1980 which is the least cost alternative now available. The remainder of the funding for the CVN–70 is planned for the FY 1974 program.

Test Data/Service Approval Date:

The design of the CVN–70 will be essentially the same as the CVAN–68/69 except with respect to an anti-submarine warfare capability. Since the equipments and systems involved in this anti-submarine warfare capability will be follow on to that being installed in active fleet carriers, it is anticipated that all systems will be service approved prior to production and installation in the CVN–70.

Contract Data:

	Program year
Newport News Shipbuilding and Dry Dock Company, CVAN–68 (FPIF)	67
Newport News, Virginia, CVAN–69 (FPIF)	70

Major Subsystems:

Turbines and Gears
Nuclear Components
TG Sets

Characteristics:

Disp. Combat Load, U—94,400 tons.
Lgth OA/Beam Ext., U—1092/252 (beam at water line 134).
Draft, Max Navig., 37.8.
Speed, C—[deleted] KTS (trial).
Shaft HP/No. Screws, C—[deleted].
Radars, U—SPA 43A, SPS 48, SPS 10, SPN 42, SPN 43, SPN 44.
Sonars, U—None except fathometer.
Guns, U—None.
Other Ordnance, C—Three basic point defense surface missile systems.

Inventory Data: [1] CVAN–68Class:

End fiscal year 1971	0
Fiscal year 1972	0
Fiscal year 1973	0
Fiscal year 1974	1
Fiscal year 1975	2

DELIVERIES (COMPLETED AT SHIPYARD)

PRODUCTION DATA

	Fiscal year—										
	1971 and prior	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Fiscal year:											
1970 and prior				1	1						
1971											
1972											
1973											
1974											1

COST HISTORY COMPARISON—BASELINE ESTIMATE TOTAL PROGRAM

	2 ships [1] (CVAN–68/69)	3 ships CVAN–68/69 and CVN–70)
Procurement	1,063.1	2,030.1
R.D.T. & E.		
Milcon		
Total program cost (fiscal year 1972 budget submission):		
Procurement	1,233.7	
R.D.T. & E.		
Milcon		
Total program cost (fiscal year 1973 budget submission):		
Procurement	1,316.2	2,283.2
R.D.T. & E.		
Milcon		

[1] Based on Dec. 31, 1971 selected acquisition report (SAR).

Note: All amounts above include outfitting and post delivery requirements which will be budgeted in the fiscal years wherein the obligations will be incurred. Amounts do not include $108,000,000 for nuclear spares which are not reflected in selected acquisition reports.

Differences between fiscal year 1972 and fiscal year 1973: fiscal year 1973 primarily reflects the identification of cost growth on CVAN–68 and CVAN–69.

[1] *Enterprise* (CVAN–65), now operating, not included.

Admiral KING. Last year, the Secretary of the Navy requested that advance funding for CVN–70 be authorized and funded and also recommended offsetting reductions so that there was no net increase to our fiscal 1972 shipbuilding program. At the time that the Congress received the initial budget request, the Secretary of Defense had not rendered his decision on the carrier. By letter dated April 27, 1971, the Deputy Secretary of Defense, Mr. Packard, advised the congressional committees that it was desirable at the time to postpone the construction of CVN–70 but that he would consider again the inclusion of long leadtime funds during the formulation of the fiscal 1973 budget. This item is included in the program for this year.

When CVN–70 joins the fleet in 1980, the *Essex* and *Midway* class veterans will have passed the end of their 30 year useful lives. This will leave a force level of modern, broadly capable carriers which includes only the eight *Forrestal* class and four nuclear powered carriers, including CVN–70. The optimum readiness posture feasible with only this number of multi-mission carriers is a combination of forward deployment and quick response. Carriers deployed in the Mediterranean and the western Pacific will provide assurance to our allies and visibility to our deterrent strength—without any problems of incountry troop commitments. Backing up these forward carriers we plan to maintain the four nuclear carriers, two each in the Atlantic and Pacific, ready for rapid reinforcement or for contingency response in other areas. The nuclear carrier optimizes logistic independence and permits highspeed responses to areas of potential crisis. The modern nuclear carrier arrives fully ready with sufficient, self-contained ordnance and aircraft fuel for full air operations over an extended period. CVN–70 will more than any single new general purpose weapon system, demonstrate our will and our capability to meet any challenges, and will bolster that visible and credible naval strength which can deter war.

Senator YOUNG. As I read the data sheet, the total estimated cost of this ship is $951 million exclusive of outfitting and post delivery charges. Am I correct in this?

Admiral KING. Yes, sir. The current estimated end cost of CVN–70 provided longlead time funding of $299 million is approved in fiscal year 1973, is $951 million, exclusive of outfitting and post delivery costs of $16 million.

ORIGINAL COST OF "NIMITZ"

Senator YOUNG. What was the original estimated cost of the *Nimitz*, and what is your current estimated cost?

Admiral KING. The current estimate of program cost for CVAN–68 and CVAN–69 is $1,316.2 million, which consists of $627.7 million for CVAN–68, $664.5 million for CVAN–69 and $24 million for outfitting and post-delivery costs. This represents an increase of $253 million over the development cost estimate of $1,063.2 million which was made 5 years ago in 1967 and consisted of $536 million for CVAN–68, $510 million for CVAN–69 and $17.2 million for outfitting and post-delivery costs.

"NIMITZ" DELIVERY SCHEDULE

Senator YOUNG. When do you expect the *Nimitz* to join the fleet, and what was the original schedule for this ship's joining the fleet?

Admiral KING. In 1970 the Navy reported to Congress in testimony and in the Selected Acquisition Reports that due to delays in delivery of nuclear components for the *Nimitz* (CVAN–68) the contract delivery date had been changed from June 1972 to September 1973. Because the *Eisenhower* (CVAN–69) uses the same shipyard facilities as the *Nimitz*, the Navy also reported a delay in the *Eisenhower* from March 1974 to June 1975, 21 months after delivery of *Nimitz*. The delivery schedule for the leadship, *Nimitz*, is very tight, with propulsion plant testing the critical item. The delays to *Nimitz* and *Eisenhower* result from the fact that it takes such a long time to manufacture the large nuclear components required for the two-reactor carriers. It is this manufacturing span which makes it so urgent that we get started as soon as possible on the nuclear components for CVN–70, since delivery of these nuclear components controls completion of the ship. Fiscal year 1973 funding for long leadtime nuclear propulsion components will permit delivery of CVN–70 in September 1980.

"EISENHOWER" COST AND DELIVERY SCHEDULE

Senator YOUNG. What is the current estimated cost of the *Eisenhower*, and what was the original estimated cost of this ship?

Admiral KING. The current estimated end cost of *Eisenhower* (CVAN–69) is $664.5 million. The development cost estimate which was made 5 years ago in 1967 was $510 million.

Senator YOUNG. When do you expect the *Eisenhower* to join the fleet, and how does this compare to the original schdeule?

Admiral KING. *Eisenhower* is being constructed in series with NIMITZ, using the same shipyard facilities. As previously reported in Selected Acquisition Reports, *Eisenhower* delivery has been delayed from March 1974 to June 1975.

CVN AND CVAN DEFERRED

Senator YOUNG. I note that the designation of this ship is the "CVN–70", and as I recall, the previous designation for these ships was "CVAN." What is the significance of the change in the designation of these ships?

Admiral KING. CVN–70, when completed in 1980, will be a near duplicate of *Nimitz*. It will have the same hull, same nuclear propulsion system, the same major components, but it will be designated "CVN." Until recently the Navy's carriers have been designated CVA or CVS with an "N" added when the carrier has nuclear propulsion. The "CVA" identified an attack carrier, one whose air wing was developed around aircraft capable of surface attack missions. The "CVS" designated an antisubmarine warfare (ASW) carrier, one whose aircraft were capable of detecting and attacking submarines. As the number of carriers in active service has been reduced, it has become quite clear that it will not be possible to maintain separate groups of carriers for these two missions. Recent operational exercises have investigated the

feasibility of combining the missions, and have shown that both attack and ASW aircraft can be operated together from our modern carriers. When a carrier is outfitted to support both ASW and attack aircraft, its designation will be changed to CV (CVN, when it has nuclear propulsion).

The designation of the Navy's new carrier as CVN–70, rather than as CVAN–70, describes the true multimission capability that will be available when this carrier joins the fleet. CVN–70 will have the varied air strength required to permit it to operate against hostile air, surface and sub-surface weapons. In addition to having the most modern and advanced facilities for supporting and operating fighter and attack aircraft, CVN–70 will have the sophisticated analysis, control, and support equipment development by ASW forces.

When the carrier is expected to operate in its sea control role against submarine, surface and air threats, its air wing can be adjusted to provide the types and numbers of aircraft needed to defeat these hostile weapons. This flexible carrier air wing can be adjusted from one tailored for sea control missions with a high concentration of ASW and fighter aircraft, through intermediate stages of moderate ASW and increased attack strength to one optimized for projection of tactical air power ashore. At the ASW end of the capability spectrum is an air wing of S–3 fixed-wing ASW aircraft and SH–3 ASW helicopters (to detect and to attack submarines), F–14 fighter aircraft (defense against air reconnaissance and air attack), and a moderate number of A–6 or A–7 attack aircraft (to defeat surface combatant ships). At the opposite end of this spectrum is the tactical air wing, strong in attack aircraft, developed and proven over the past several years of attack carrier operations.

CVN–70 will have the facilities for these varied capabilities installed during construction. CVN–70 will be a multi-mission carrier with a multi-purpose air wing, a ship whose strength can be tailored to combat the particular threat it is expected to encounter.

SEA CONTROL SHIPS (SCS)

Senator YOUNG. The next item to be considered is the Sea Control Ship for which $10 million is requested. The ship data sheet will appear at this point in the record.

(The information follows:)

FISCAL YEAR 1973 PRESIDENT'S BUDGET ESTIMATE—SHIP DATA SHEET

SERVICE: NAVY

Nomenclature: Sea Control Ship; P–I line item: 20; popular name: None.

Description/Mission.—The Sea Control Ship (SCS) is an austere, small ship platform from which a small group (17) of helicopters and vertical/short take-off and landing aircraft will operate. The Sea Control Ship and aircraft together are intended to provide ASW capability between the broad area defense of Maritime Patrol (VP) patrol aircraft and anti-submarine carriers and the point defense capability of a surface escort. Its principal mission is the protection of Underway Replenishment Groups, mercantile convoys, amphibious assault forces, and task groups with no aircraft carrier in company. Tasks include anti-submarine warfare, airborne early warning, anti-air warfare, anti-ship missile defense, and surface attack.

COST DATA

[Dollars in millions]

	Fiscal year—									
	1970 and prior	1971	1972	1973	1974	197	1976	1977	Cost to complete	Current estimate, total program
Quantity [1]		0	0	0	1	3	2	2	0	8
Ship cost [1]		0	0	0	$116.0	$300.0	$200.0	$200.0	0	$816.0
Less advance procurement		0	0	0	10.0	0	0	0	0	10.0
Net current year program		0	0	0	106.0	300.0	200.0	200.0	0	806.0
Advance procurement calendar year		0	0	$10.0	0	0	0	0	0	10.0
Weapons systems cost		0	0	10.0	106.0	300.0	200.0	200.0	0	816.0
Outfitting/postdelivery [2]										
R.D.T. & E		$.2	$3.0	6.0	0	0	0	0	0	9.2
Milcon		0	0	0	0	0	0	0	0	0
Program acquisition cost [1]		.2	3.0	16.0	106.0	300.0	200.0	200.0	0	825.2
Average unit cost										103.1

[1] Tentative. Ship acquisition plan to be determined 1st quarter fiscal year 1973.

[2] To be determined.

Basis for FY 1973 Request

The Navy's objective is full funding of the first Sea Control Ship in FY 74 in order to achieve a ship acquisition schedule with delivery of the lead ship in FY 77. A current major milestone is a DCP in April 1972 aimed at a DSARC I decision by June 1972 to proceed with the SCS program. This would permit utilization of the FY 73 $10 million currently authorized by DOD for advance procurement in the SCSS program. Detailed design must commence in early CY 73 in order to complete the lead Sea Control Ship acquisition as scheduled (delivery of lead ship FY 77).

RDT&E funding is required to continue preliminary design and commence contract design (development and specifications and guidance drawings for construction) for the first ship, to initiate prototype radar development for an AEW helo, and to develop systems which will be employed in the air-ship system interface.

Test and Evaluation.—The SCSS concept is being supported by an extensive test and evaluation program. Preliminary evaluation has been underway for several months on the West Coast using helicopters and an LPD, the USS CLEVELAND. Major tests commenced in January 1972 on the East Coast. The USS GUAM, an LPH, assigned as a dedicated interim sea control ship until mid-Cy 1973, recently commenced the prototype phase of the four-phase program. SH–3 helicopters from a newly commissioned helicopter squadron dedicated to this evaluation project and USMC HARRIER VSTOL aircraft are embarked. Sub-systems and sensors will undergo evaluation to develop procedures and tactics to prove the concept and provide inputs for preliminary and contract design during later tactical and evaluation phases of the program. The last part of the T and E program, an operational phase, will involve deployment of the interim SCSS.

Contract Data. To be determined.

Major Subsystems.—17 aircraft of helo/VSTOL type; mix to be determined.

	Class	Sea control ship
Length (W.L.)	U	630 feet.
Beam	U	76 feet.
Draft	U	21 feet.
Displacement (FL)	U	14,100 tons.
Endurance at 20 knots	C	[Deleted] Nautical Miles.
Speed (sustained)	C	[Deleted] knots.
Propulsion	U	Gas turbine.
Shaft horsepower/number screws	C	[Deleted]
Armament	C	[Deleted]
Personnel accommodations	U	750.[1]
Catapult/Arresting gear	U	None.
Elevators	U	2.

[1] To be manned by maximum of 700 people.

Inventory Data.—Not applicable.

Cost history comparison

Baseline estimate total program [1]

[1] Tentative. Ship acquisition plan to be determined first quarter, fiscal year 1973.

Procurement	816.0
RDT&E	9.2
MILCON	0
Total	825.2

Total program cost (fiscal year budget submission)

Procurement	0
RDT&E	3.0
MILCON	0
Total	3.0

Total program cost (fiscal year 1973 budget submission)

Procurement	816.0
RDT&E	9.2
MILCON	0
Total	825.2

Admiral KING. $10 million of advance funding is requested for contract design, Mr. Chairman, for a lead sea control ship planned for the next fiscal year. The SCS will be a relatively small, austere ship whose principal mission will be to protect: (1) merchant ships bringing critical resources to the United States; (2) underway replenishment groups, (3) amphibious assault forces, and (4) task groups that have no aircraft carriers in company. It will be configured to conduct antisubmarine and limited antiair warfare missions and to provide defense to forces which are required to operate worldwide in low-threat areas. The program is now in concept formulation; preliminary design has begun. As we now see it, the SCS will displace about 15,000 tons and carry about 17 aircraft, including helicopters and vertical or short take-off and landing type aircraft. Follow-on ships are expected to cost less than a hundred million dollars each. The sea control ship will not provide a capability to project forces ashore and it will not be able to achieve air superiority.

Senator YOUNG. I note in the P–1 exhibit that the sea control ship is included under the broad category of "Amphibious ships" rather than "Other warships." Just why is this considered to be an amphibious ship?

Admiral KING. The sea control ship (SCS) was initially placed in the amphibious element as a temporary measure pending assignment of an ultimate program element for this new ship type. In the current FYDP, it is shown under antisubmarine warfare escorts; PE 24413. However, action is now underway to assign the SCS a singular code of 2–42–3, mobile air base, escort.

Senator YOUNG. Specifically, what will this $10 million be used for? When will you obligate this $10 million?

Admiral KING. The $10 million for long leadtime funding will be used to fund the effort required for ship systems design support and the detailed design development for production. It is intended to commence obligating these funds in January 1973 with total obligation completed by April or May 1973.

COMPARISON WITH PATROL FRIGATE

Senator YOUNG. How does the mission of this proposed ship differ from the mission of your patrol frigate?

Admiral KING. Although the escort ship (PF) and the sea control ship (SCS) have similar missions to perform, they are designed to handle different portions of the threat spectrum. The PF will be required in large numbers to perform its mission and also to provide protection to the smaller number of sea control ships.

The PF is optimized to provide the inner ring defense in the naval formation [deleted]. However, to counter the capability of the Soviet long-range standoff weapons that can be launched from submarine, aircraft and surface ships, airborne systems are required to extend the protection range of escort ships. Aircraft carriers could be used for

this role. However, they will not be available in sufficient numbers to protect naval forces in the many parts of the world that may be challenged by Soviet naval power.

The Sea Control Ship System was conceived to fill this gap. The concept envisages austere Sea Control ships in a low air threat environment in a coordinated effort with embarked aircraft with sensors and weapons maximized in the mix of 17 helicopters and vertical/short takeoff and landing aircraft (VSTOL) and assigned escorts (DE and/or PF). This force would furnish protection to naval formations or mercantile convoys without an aircraft carrier present. The DE/PF escorts would provide the inner or perimeter defense, and their embarked light airborne multipurpose (LAMPS) helos would be used in a threat reactive role performing ASW and ASMD tasks. The Sea Control Ship antisubmarine aircraft would provide defense in depth against Soviet missile-equipped [deleted] submarines [deleted]. Embarked airborne early warning aircraft and deck-launched VSTOL aircraft would provide a limited air intercept and surface attack capability [deleted].

The Sea Control Ship System thus provides an extension of the defense perimeter covered by the surface escort (PF) in order to protect naval/mercantile formations against the formidable, long-range Soviet submarine and antiship cruise missile threat.

Use of R. & D. Funds

Senator Young. I note that the request for R. & D. includes $6 million for this ship. Generally speaking, just what will be done with these R. & D. funds?

Admiral King. The $6 million R. & D. funds will be used for the in-house contract design effort required prior to contracting for the ships systems design support and the detailed design development for production.

Comparison With ASW Carriers

Senator Young. I note that you contemplate a ship with a displacement of about 14,100 tons. How does this compare to the displacement of our small ASW carriers?

Admiral King. The SCS will displace approximately 14,000 tons as compared to our present small ASW carriers of about 40,000 tons. a difference of around 26,000 tons displacement.

Gas Propulsion

Senator Young. I note that you contemplate a gas turbine propulsion system for this ship. Is this a fully developed propulsion system, or is there some R. & D. effort involved in the propulsion effort?

Admiral King. The gas turbine propulsion system contemplated will be the same as those procured for the DD–963 and PF classes of ships. No additional R. & D. effort in the gas turbine area for the SCS is contemplated.

Personnel Utilization

Senator Young. I note that you plan to have a crew of about 700 people for this ship. I noted somewhere that you expect to have only

17 aircraft aboard these ships. Just what is the reason for the very large crew?

Admiral KING. In order for the SCS with its embarked air group to operate at 100 percent efficiency around the clock, a manning level of 893 personnel was determined to be required. However, this figure was arrived at by using current manning practice, current maintenance policy and current watch standing philosophy. The CNO, recognizing the drain on the Navy's budget for personnel, directed that this ship and air group be manned at 700 and still operate efficiently 100 percent of the time 24 hours a day. In this regard, the CNO has directed that reduction in personnel be achieved by departures, even radical departure, from current policy and practice, realignment of existing R. & D. programs, and development of new ones to emphasize—for both ship and air suite—reduced manning through automation, reliability, ease of maintenance, combination or elimination of functions, and so forth.

VERTICAL TAKEOFF AIRCRAFT

Senator YOUNG. What is being done to develop a vertical takeoff aircraft to operate from the Sea Control Ship?

Admiral KING. There is currently an effort on going to determine the direction the Navy should pursue in developing a vertical/short takeoff and landing aircraft. Decision in this field has not yet been made. It is planned, however, to pursue this effort through the prototyping program. If an interim aircraft becomes necessary in order to meet the initial operational capability of the SCS in fiscal year 1978, the HARRIER (AV–8A) appears to be the logical candidate.

Senator YOUNG. You may proceed with your statement.

Admiral KING. Thank you, sir.

LONG LEADTIME FUNDING

In addition to the ULMS, CVN, and SCS advance funding we are requesting additional long leadtime funding as follows:

	Millions
For nuclear submarines	$125.0
For fleet ballistic missile submarine conversions	111.0
For a ballistic missile submarine tender conversion	0.3
For a nuclear powered guided missile frigate conversion	30.0
For a guided missile frigate conversion	16.1

NEW CONSTRUCTION AND CONVERSION

In summary, Mr. Chairman, we are requesting 20 new ships and conversion of nine existing ships. The total cost of the program is estimated at $2,976.6 million less $354.7 million of advance funding from prior years plus $952.4 million advance funding for future years. The total obligational authority being requested is $3,564.3 million. None of these funds are for industrial facilities.

Mr. Chairman, this completes my prepared statement.

QUESTIONS BY SENATOR THURMOND

Senator YOUNG. Senator Thurmond was unable to be here today but has asked that questions submitted by him be answered for the record. The questions and the responses will appear at this point.

(The information follows:)

SHIPBUILDING PROGRAM DELAYS

Senator THURMOND. Admiral King, generally speaking why is the Navy behind in its shipbuilding program for the past few years?

Admiral KING. The following are some of the reasons which have had an influence in delaying the scheduled delivery of ships:

1. Competition for labor with other military and space requirements over the past six years.
2. Strikes.
3. Acts of God.
4. Problems with delivery of both contractor and government furnished equipment.
5. Urgent military changes.

REMEDIAL ACTION ON DELAYS

Senator THURMOND. What is the Navy doing to reduce these delays?

Admiral KING. Tabulated below are some of the more important achievements of our program to obtain timely ship deliveries:

1. More realistic advance planning.
2. Improved preplanning of material and information to be furnished by the Government.
3. Improved contract terms and conditions.
4. Establishment of Shipbuilding Industry Advisory Committee to increase communication with industry.
5. Concentrated action on Shipbuilding and Conversion Improvement Program.
6. More stringent Pre-Award Surveys and avoidance of awards to poor performers.
7. Increased emphasis on monitoring shipbuilding schedules and progress.
8. Increased use of production audits of private shipyards.
9. Increased motivation of contractors.

DELAY COSTS

Senator THURMOND. Admiral, is the contractor accepting the cost of these delays or is the Navy faced with claims based on design changes or other problems chargeable to the Navy?

Admiral KING. In some cases the contractor has accepted the cost of the delays while in other cases the Navy is faced with contractor claims based on various types of alleged delay and disruption.

PATROL FRIGATE PROGRAM

Senator THURMOND. Admiral King, in your statement you have stressed the importance of the Patrol Frigate program. What is the cost of the total program of about 50 ships?

Admiral KING. Our estimates show the PF program cost at $2731.5M. This figure is composed of $2717.4M in SCN and $14.1M in RDT&E. This excludes the outfitting and post delivery costs which have not yet been computed in detail, but will probably be about $215M. If this figure is correct the total program cost for the 50 ship program will be $2946.5M using as a basis for cost estimates the escalation indices currently approved by OSD.

Senator THURMOND. On what inflation basis did the Navy figure these ships would cost if projected through 1979?

Admiral KING. The inflationary impact on these ships was calculated on the basis that the program would consist of large ship quantity multi-year procurements. On this basis, the increase for inflation through FY 1979 ranges between 2% and 4% per year.

ESCALATION COST POLICY

Senator THURMOND. What is the Navy policy on figuring ships escalation costs during the reminder of this decade?

Admiral KING. The projections currently in use are based on an economic forecast of the Bureau of Labor Statistics indices. Material costs are projected at a 1.8% average increase per year from FY 1972 through FY 1975 and at a 3% per year increase thereafter. Labor costs are projected at a 3.9% average increase per year from FY 1972 through FY 1975 and at a 5% per year increase thereafter.

CONVERSION COST OF GUIDED MISSILE FRIGATES

Senator THURMOND. Admiral, the conversion cost of the two guided missile frigates is $124 million. How does this high cost relate to the newer vessels in this class of ships?

Admiral KING. It has been many years since the Navy has built this class of ships and the Navy has no plans to build any additional DLG's. Consequently there is no basis for comparison with the FY 1973 conversions and the newer vessels in this class.

Senator THURMOND. Why are these conversions so costly?

Admiral KING. Some of the reasons for the increased cost of these conversions are as follows:

1. Naval Shipyard labor and overhead rates have increased beyond that experienced in the early years of the DLG conversion program.
2. Increased deterioration of hull and machinery equipment due to the extended service of ships now entering the program.
3. Increased pressures of the Board of Inspection and Survey and the Operating forces to return a completed ship. This includes not only completion of all repairs but a ship which meets the latest specification requirements, particularly in the area of operability, safety, and habitability.

SSN–688 CONSTRUCTION SCHEDULE

Senator THURMOND. Admiral King, why does the Navy want to initiate construction on more high speed submarines in FY 1973 than in FY 1972 and through FY 1977?

Admiral KING. Congress in the FY 72 budget added long lead time funding for a sixth 688 SSN. The request for six SSNs in the FY 73 budget reflects our desire to augment our submarine force by the addition of this urgently required ship. The return to a request for long lead time funding for [deleted] SSNs to be procured next year does not indicate a desire to reduce our procurement, but rather is dictated by fiscal constraints imposed by the requirements of other new programs and the general effect of rising cost of military procurement.

SSN 688 CAPABILITY COMPARED WITH SOVIET SUBMARINES

Senator THURMOND. How do these submarines compare in capability with the newer Soviet type high speed attack subs?

Admiral KING. The latest operational classes of Soviet nuclear submarines, the Charlie and Victor, have [deleted] over the first generations of Soviet nuclear submarines. The second generation submarines are capable of speeds of at least [deleted] knots.

The SSN 688 Class nuclear attack submarine will restore the tactical balance of speed for U.S. submarines. In addition the SSN 688 Class will maintain the U.S. lead in quieting and acoustic performance. Armed with the new MK 48 torpedo the SSN 688 Class nuclear attack submarine will maintain the qualitative advantages of our submarines.

STUDY ON CVN–70 SUMMARIZED

Senator THURMOND. Admiral, CVN–70 is listed as the Navy's top priority item in the FY 1973 shipbuilding account. In your statement you mentioned a study which fully justifies this program. Would you summarize, for the record, the major findings in this study?

Admiral KING. CVN–70, the third nuclear powered aircraft carrier of the NIMITZ Class, has probably been studied more than any other previous ship. Following years of studies on the advantages of nuclear propulsion, CVN–70 was first approved by DOD in FY 1967 FYDP for construction in FY 1971. The approved plan called for three NIMITZ class carriers to be built to the same basic design and procured from a single shipbuilder on a modified multi-year

contract in order to acquire three nuclear carriers of the most advanced capability at the least cost. This plan was approved by DOD and concurrence in the multi-year procurement plan was requested and received from the four Chairmen of the Congressional Appropriations and Armed Services Committees.

Funding for CVN–70 was delayed by the requirement for further study which was set forth in the Military Procurement Authorization Act for Fiscal year 1970 (Sec. 402 of Public Law 91–121). Pursuant to the statutory requirement for a comprehensive study, joint hearings on the carrier were conducted in April 1970 by the Joint Senate-House Armed Services Subcommittee of the Senate and House Armed Services Committees. The extensive hearings compiled over 750 pages of testimony and supporting data from the recognized experts in the field.

In reviewing the entire concept of naval aircraft carrier forces, the "Navy Staff Study on Attack Carriers" was analyzed in great detail. The major conclusions drawn from the study are summarized as follows:

The attack carrier is the principal surface ship through which our use of the seas in support of our national objectives is assured.

As a collateral function, the attack carrier shares with land-based air the mission of providing tactical air support for general purposes overseas. However, over seas tactical air, whether land based or carrier based, requires as a prerequisite control of the overseas lines of logistic support.

It is a matter of historical record that the attack carrier has been highly effective in the performance of its assigned roles.

Carriers and their air wings have consumed only a small portion of past military budgets and national expenditures in comparison with the critical need for them and their high usefulness.

The trend toward a continuing erosion of overseas basing indicates that the attack carrier's role in providing overseas tactical air may be substantially emphasized.

The growing capability of the Soviet Fleet is an expanding threat to our continued supremacy at sea. Today the attack carrier force is the margin of difference between the two navies.

To maintain the modernity and capability of the attack carrier force requires rep'acement of obsolescent ships.

The CVAN-70 is required to assure the Navy a *minimum* force of 12 modern attack carriers by 1980.

Failure to provide advance procurement funds for CVAN–70 in FY 1971 will greatly increase its cost because of disruption of special NIMITZ class nuclear component production lines, inefficiencies in shipyard and component supplier's factories due to production gap between EISENHOWER and CVAN–70, and overall stretchout of the NIMITZ class carrier construction program.

Control of the seas is essential to the security of the United States.

The attack carrier is the principal surface ship.

Following the extensive hearings, the Report of the Joint Senate-House Armed Services Subcommittee reviewed the principal findings of its study and concluded:

"The subcommittee, in consideration of the fu'l range of carrier capabilities including modernity and the exceptional advantages of nuclear power, is of the opinion that the long lead funds for the CVAN–70 should be approved."

Additionally, the annual review process within DOD in preparation of the Defense budget request includes further review and study of all factors bearing on the need for CVN–70. There has been no change in the strong conviction that we must start constructing CVN–70 now, as evidenced by Secretary of Defense Laird's emphatic statement that "This carrier has been extensively studied and it is a firm requirement."

CVN–70 Delay Risk

Senator Thurmond. What deficiency would the Navy face if this program, the CVN–70 is disapproved?

Admiral King. Any further delay in this vital program would incur an unacceptable risk. We have reached a point in the balance of naval power at which we must proceed without delay with the increased naval modernization program to provide forces capable of assuring continued freedom to use the seas in support of our national interest. Our decisions in this regard will be closely observed

by friendly and other nations alike, and our determination will be measured accordingly.

If we, as a maritime nation, are to engage in world commerce, and support our overseas friends and interests, we must have a strong Navy capable of deterring or if necessary defeating any challenge to our vital interests. The Soviet navy now has the capability to pose serious obstacles to our foreign policy and economic objectives.

Our narrowing margin of superiority over the Soviet navy is still maintained by our shrinking and aging carrier force—the backbone of our sea control and force projection capabilities. Modernization of our aircraft carrier force is absolutely essential to the naval strength of this nation. The reduction in numbers of carriers we have had to effect makes it more important than ever that each carrier we have is the most modern, most capable fighting ship that we can build. Without enough modern, fully capable aircraft carriers to maintain superiority at sea, all other U.S. naval surface forces and shipping would be incapable of surviving in the face of a high intensity threat. The potential detriment to the United States as a world power would be incalculable.

The minimum number of first line aircraft carriers required to maintain a credible peacetime deterrent at sea is fifteen. Yet even at a force level of fifteen our carrier force is in an aging schedule which requires modernization by new, highly effective nuclear powered carriers such as CVN–70. The advantages of nuclear power and the increased combat capability of this fourth nuclear powered carrier will compensate to some extent for the one-third reduction in the number of carriers we are now operating. We are not proposing that CVN–70 be an addition to carrier force levels. It is to replace an overage carrier.

Further delay in approval of CVN–70 would result in a continuing decline in the Navy's quantity and quality of the Navy's aircraft carriers. The shift in the naval balance of power would continue and the Soviets would have a freer hand at sea.

SUBCOMMITTEE RECESS

Senator YOUNG. I don't think we have any more questions, so that completes this session. We will meet at 10 o'clock tomorrow morning.

(Whereupon, at 12:10 p.m., Monday, March 6, the subcommittee was recessed, to reconvene at 10 a.m., Tuesday, March 7.)

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1973

WEDNESDAY, MARCH 8, 1972

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee met at 10 a.m., in room S–126, the Capitol, Hon. Allen J. Ellender (chairman), presiding.

Present: Senators Ellender, Young, and Allott.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE NAVY

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION

STATEMENT OF HON. ROBERT A. FROSCH, ASSISTANT SECRETARY OF THE NAVY (RESEARCH AND DEVELOPMENT)

ACCOMPANIED BY:

VICE ADM. R. WEYMOUTH, USN, DIRECTOR OF RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, OFFICE OF THE CHIEF OF NAVAL OPERATIONS

REAR ADM. T. D. DAVIES, USN, CHIEF OF NAVAL DEVELOPMENT AND DEPUTY CHIEF OF NAVAL MATERIAL FOR DEVELOPMENT

REAR ADM. S. H. MOORE, USN, DIRECTOR OF BUDGET AND REPORTS, OFFICE OF THE NAVY COMPTROLLER

REAR ADM. C. O. HOLMQUIST, USN, CHIEF OF NAVAL RESEARCH

BRIG. GEN. D. H. BROOKS, USMC, DEPUTY CHIEF OF STAFF (RESEARCH, DEVELOPMENT, AND STUDIES) HQMC

REAR ADM. H. E. LYON, USN, PROJECT MANAGER, UNDERSEA LONG-RANGE MISSILE SYSTEM

REAR ADM. L. A. SNEAD, USN, PROJECT MANAGER, F–14 PROJECT

COL. O. R. SWIGART, JR., USMC, HEADQUARTERS, U.S. MARINE CORPS

COMDR. J. T. PARKER, USN, SPECIAL ASSISTANT TO ASSISTANT SECETARY OF THE NAVY (R. & D.)

COMDR. W. C. BENTLEY, USN, SPECIAL ASSISTANT TO ASSISTANT SECRETARY OF THE NAVY (R. & D.)

MRS. M. FERGUSON, COMPTROLLER, OFFICE OF NAVAL RESEARCH

W. A. McMILLAN, OFFICE OF THE DIRECTOR, R.D.T. & E., OPNAV

J. A. McCARTNEY, OFFICE OF THE NAVY COMPTROLLER

BUDGET REQUEST

Chairman ELLENDER. The subcommittee will come to order.

The next appropriation to be considered is "Research, development, test and evaluation, Navy" for which the fiscal year 1973 budget estimate is $2,729,987,000. The fiscal year 1972 appropriation was $2,425,-647,000, which included $19,087,000, for the January 1, 1972, pay increase.

PROGRAM AND FINANCING

At this point in the record there will appear certain program and financing information from the justifications.

(The information follows:)

PROGRAM AND FINANCING (IN THOUSANDS OF DOLLARS)

IDENTIFICATION CODE 97-20-1319-0-1-051	BUDGET PLAN (AMOUNTS FOR RDT+E ACTIONS PROGRAMED)			OBLIGATIONS		
	1971 ACT	1972 EST	1973 EST	1971 ACT	1972 EST	1973 EST
PROGRAM BY ACTIVITIES						
DIRECT						
1. MILITARY SCIENCES	133,291	143,505	151,144	133,762	143,158	151,353
2. AIRCRAFT AND RELATED EQUIPMENT	762,095	689,373	380,930	775,221	640,623	386,521
3. MISSILES AND RELATED EQUIPMENT	438,866	520,813	962,312	442,164	534,953	954,101
4. MILITARY ASTRONAUTICS AND RELATED EQUIPMENT	26,878	43,055	89,821	26,689	41,102	90,249
5. SHIPS, SMALL CRAFT, AND RELATED EQUIPMENT	278,877	411,227	430,283	285,269	417,494	425,976
6. ORDNANCE, COMBAT VEHICLES, AND RELATED EQUIPMENT	64,275	59,965	44,753	65,124	64,356	45,720
7. OTHER EQUIPMENT	367,816	448,962	511,722	365,725	453,489	513,815
8. PROGRAMWIDE MANAGEMENT AND SUPPORT	143,103	152,947	159,102	142,290	154,275	158,252
TOTAL DIRECT	2,212,001	2,381,847	2,729,987	2,240,164	2,449,370	2,725,987
REIMBURSABLE (TOTAL)	153,270	70,483	50,452	131,931	120,483	54,452
SUBTOTAL	2,365,271	2,452,330	2,780,439	2,372,095	2,569,853	2,780,439
INTRAFUND OBLIGATIONS	-29,949	-10,000	-10,000	-24,410	-10,000	-10,000
10 TOTAL	2,335,322	2,442,330	2,770,439	2,347,685	2,559,853	2,770,439
FINANCING						
RECEIPTS AND REIMBURSEMENTS FROM						
11 FEDERAL FUNDS	-122,556	-59,483	-39,452	-143,885	-59,483	-39,452
13 TRUST FUNDS	-34	.....	.....	-63	.....	.....
14 NON-FEDERAL SOURCES 1/	-731	-1,000	-1,000	-628	-1,000	-1,000
21 UNOBLIGATED BALANCE AVAILABLE, START OF YEAR FOR COMPLETION OF PRIOR YEAR BUDGET PLANS	.....	.....	.....	-312,831	-287,523	-150,000
REPROGRAMING FROM (-) OR TO PRIOR YEAR BUDGET PLANS	-34,200	-20,000	.....	.....	.....	.....
22 UNOBLIGATED BALANCE TRANSFERRED FROM OTHER ACCOUNTS	.....	-20,000	.....	.....	-20,000	.....
23 UNOBLIGATED BALANCE TRANSFERRED TO OTHER ACCOUNTS	.....	20,000	.....	.....	20,000	.....
24 UNOBLIGATED BALANCE AVAILABLE, END OF YEAR FOR COMPLETION OF PRIOR YEAR BUDGET PLANS	.....	.....	.....	287,523	150,000	150,000
BUDGET AUTHORITY	2,177,801	2,361,847	2,729,987	2,177,801	2,361,847	2,729,987
BUDGET AUTHORITY						
40 APPROPRIATION	2,151,412	2,352,319	2,710,900	2,151,412	2,352,319	2,710,900
41 TRANSFERRED TO OTHER ACCOUNTS	-1,400	.....	.....	-1,400	.....	.....
42 TRANSFERRED FROM OTHER ACCOUNTS	27,789	.....	.....	27,789	.....	.....
43 APPROPRIATION (ADJUSTED)	2,177,801	2,352,319	2,710,900	2,177,801	2,352,319	2,710,900
44.95 JAN 1972 PAY INCREASE SUPPLEMENTAL/AMENDMENT	.....	9,528	19,087	.....	9,528	19,087

1 REIMBURSEMENTS ARE DERIVED PRINCIPALLY FROM PROVISION OF LABORATORY SERVICES TO PRIVATE ORGANIZATIONS (10 U.S.C. 2481).

THE AMOUNTS SHOWN AS JAN 1972 PAY INCREASE SUPPLEMENTAL/AMENDMENT ARE NOT DISTRIBUTED TO EACH INDIVIDUAL APPROPRIATION IN THE FY 1973 PRESIDENT'S BUDGET, BUT ARE REFLECTED AS A ONE-LINE DEFENSE-WIDE CONTINGENCY AMOUNT. THE AMOUNTS SHOWN ABOVE ARE ESTIMATES, PENDING FINAL DETERMINATION OF THE AMOUNTS TO BE REQUESTED WHEN SUPPLEMENTAL AND AMENDED ESTIMATES ARE FORMALLY TRANSMITTED.

INTRODUCTION OF ASSOCIATES

Chairman ELLENDER. Dr. Frosch, you are the first witness.

Dr. FROSCH. Thank you.

It is a privilege to appear again before this committee to present to you the fiscal year 1973 program and budget for research, development, test, and evaluation, Navy.

With me today are my principal assistants in the management of the day-to-day business of Navy R. & D. Vice Admiral Weymouth has relieved Rear Admiral Ruckner as Director, research, development, test, and evaluation since our last meeting. Rear Admiral Davies, Chief of Naval Development, and Deputy Chief of Naval Materiel (development); Rear Admiral Holmquist, Chief of Naval Research; and Brigadier General Brooks, Deputy Chief of Staff (research, development, and studies), USMC, have all appeared before you with me in previous years.

PRESENTATION FORMAT

In addition to the program element and fiscal display backup books, we have delivered to the committee a voluminous and detailed statement containing as appendixes the relevant fiscal analyses and a detailed program review by budget activity. I offer this to you for such use as you wish to make of it. The initial portion of this statement amounts to a blue lined version of the whole, rearranged and rewritten to emphasize the general factors and views which tie the various aspects of the program together. I propose to use this portion of the written statement as the basis for my oral presentation today. It should take about an hour if read continuously. Naturally, in this brief formal presentation almost all detail must be omitted; these details are in the appendix portion of the written statement and in the backup books and I shall rely on your questions as an opportunity to guide me in bringing out those points which will be of most interest to you in the discussion. I expect that points I make in this presentation will suggest to you areas for more detailed exploration in our discussions. I will welcome questions from the committee at any time during my presentation.

FUNDING INCREASE: UNDERSEA LONG-RANGE MISSILE SYSTEM (ULMS) ACCELERATION

The Navy, including the USMC, is requesting new obligational authority amounting to $2.73 billion for fiscal year 1973 R.D.T & E. programs. The increase in request reflects some change in program emphasis primarily as a result of accelerating the undersea long-range missile system (ULMS). This change is partially compensated by declining R.D.T. & E. allotments to the F–14 and S–3 aircraft as those developments come closer to completion. There are many other changes in emphasis that I will try to highlight as we proceed. A summary of this program by budget activity along with program details will be found in the appendixes to this statement.

CHANGES IMPOSED BY RUSSIAN THREAT: INCREASED U.S. TECHNOLOGY BASE IMPERATIVE

As you know, the Navy today is undergoing its most dynamic change since the introduction of modern aviation. I will attempt to highlight what the R. & D. program is doing to help bring about the CNO's "Navy of the Future." I will discuss where we are going, some of the new things we have done, a few important successes—and a disappointment or two as well—actions we have taken or intend to take, conclusions we have drawn and some of the business aspects of managing R. & D.

In recent months, we have again taken careful stock of our naval capability vis-a-vis potential antagonists, particularly as related to relative technological investment. Our Navy is facing a host of new operational challenges that result in large part from a major reorientation of the Soviet Union's tactical and strategic capabilities. Russia has made continuing progress in quiet submarines, improved aircraft, and surface, subsurface and air-launched missiles, combined with new tactics to exploit these developments vigorously and is challenging the Navy in ways entirely new since the end of World War II. These problems are further compounded by the introduction of capable antiship weapons into other navies.

We must meet these new and increasing threats through a broad spectrum of actions, prime among which is the strengthening of our technology base, and thus our ability to respond to threats.

SELECTION OF RESEARCH PROJECTS

Our new Navy is being built from a base of sophisticated technologies, a base that is crucially dependent upon research. Research supplies new ideas which become candidates for development of weapons and equipment to solve operational problems. Research provides the solution to scientific problems and allows the rapid application of emerging technologies to support naval missions and functions. Research provides a base of understanding which can be drawn upon to solve completely new and previously unexpected problems. Admittedly, it is difficult to predict far in advance the precise relationship between specific research and technology development. However, we do have a sense of technological tread which, combined with the challenges facing the new Navy, give us a firm feeling for the kinds of risk-taking research ventures which are liable to pay off.

Electromagnetic Spectrum

We know, for example, that the Navy of the future must have access to more of the electromagnetic spectrum than it uses today. The need for specialized communications, possibly [deleted] and often across the air/sea boundary; countermeasures, and a broad range of detection, tracking, and surveillance requirements all point to the importance of having new equipment to operate in these new parts of the spectrum. This in turn leads us to support research on new millimeter wave techniques, lasers, mathematical signal processing, and very low frequency and extremely low frequency effects in the ionosphere and in the sea.

SUPERCONDUCTIVITY AND MATERIALS

It seems clear that research on superconductivity will pay off with smaller, higher powered electric motors and generators. This could be a positive contribution to the propulsion systems of ships and submarines of the new Navy. Materials research will make new technologies available for naval applications and will improve existing systems. There will be ultrastrong ceramics for sonar applications and new materials for smaller, more powerful propulsion and energy conversion systems. Improved materials for jet engines will be particularly important for the future of vertical takeoff and landing aircraft for the sea control ship and USMC close support aircraft.

IN-HOUSE RESEARCH AND MILITARY PERSONNEL ENGAGED THEREIN

Chairman ELLENDER. Can you tell us how much of this work is being done inhouse?

Dr. FROSCH. Of the research work, or what?

Chairman ELLENDER. I would like to know how much of the $2.7 billion you are requesting in Navy research and development is planned to be spent on inhouse work. I would also like to know the number of military personnel so involved, because they are paid from a different appropriation.

Dr. FROSCH. I will have to get that number from the backup. But the total amount of money in inhouse R.D.T. & E. in this budget is $768,132,000.

Chairman ELLENDER. Aside from that, we have the cost of research-oriented military personnel.

Dr. FROSCH. The average number (man-years) of military personnel involved in R.D. & E. work in the laboratories is 6,475.

Chairman ELLENDER. They are not paid out of this appropriation; are they?

Dr. FROSCH. No; they are paid out of military pay, Navy.

MILITARY PERSONNEL RESPONSIBILITIES

Chairman ELLENDER. Exactly. If you consider what they do as in-house work, what kind of work do they do?

Dr. FROSCH. At each of the laboratories, most of which are civilian manned, there is a small group of military officers. There is normally a military officer in charge of the laboratory and a support group who are responsible for management and administration of the overall installation. There are sometimes a few officers and enlisted men assigned in technical building. However, in the test and evaluation organization such as Patuxent, or where there is major operational testting of aircraft, there are a large number of military officers assigned because they do the actual test flying of the aircraft and the maintenance of the aircraft.

Chairman ELLENDER. These are Navy facilities?

Dr. FROSCH. Yes.

Chairman ELLENDER. Where do you do the $768 million of in-house work and what kind of work does it entail?

Dr. FROSCH. In the first place, about half of that is put out on contracts by the laboratories of the Defense Establishment to get

things done for them. The other half of it is spent in-house in these laboratories.

Chairman ELLENDER. By Navy personnel?

Dr. FROSCH. Principally by Navy employed civil servants. But some of the officers and enlisted men we have been talking about are also involved there.

Chairman ELLENDER. Are these personnel scientists?

Dr. FROSCH. Yes; scientists, engineers, technical people.

ASSERTED RUSSIAN SUPERIORITY AND QUESTIONABLE RETURN ON U.S. INVESTMENT

Chairman ELLENDER. Let me digress to a related subject. Last year, for fiscal year 1972, the Defense Department received about $7.7 billion for research, development, and test. This year the total request is about $8.5 billion. Recently, when Dr. Foster was before this committee, it was indicated that many research programs in the Department of Defense will not come to fruition for a number of years, if then. Meanwhile, the statement has been made repeatedly that the Russians are surging ahead of us with new hardware and new techniques in a variety of fields. You have just indicated that the Navy has 6,500 naval personnel engaged in in-house research, and this does not include the bulk of the work which is done by outside contract. I do not understand why we should be falling behind when we are pouring so much money into the effort and employing so many personnel. I must state that I do not believe the results of your efforts are as great as they should be.

Dr. FROSCH. I think we have introduced a number of weapons systems over the years commensurate with the amount of funds applied. The bulk of the $768 million, or a large part of it, does not go to just pay salaries, but goes for materials, equipment, and getting work done.

LABORATORY CONTRACTS FOR HALF OF FUNDS

Chairman ELLENDER. You started to tell me that $768 million is not all spent in-house, that you contract out?

Dr. FROSCH. About half is contracted by the laboratories out of house, for things that they need to support their development work in certain programs in which the laboratories are engaged.

Chairman ELLENDER. Such as what?

Dr. FROSCH. Such as machine parts, electronic parts, equipment, motors, and parts for fabrication.

Chairman ELLENDER. You said half of the $768 million goes to this purpose? What is the other half used for?

Dr. FROSCH. The other half is used for in-house pay, operation of ranges, for operation of facilities for doing certain manufacturing of experimental pieces in the laboratories, for conducting experiments, for range safety, for the whole operation of the experimental work, for development, testing, and evaluation.

CONTRACTS WITH UNIVERSITIES

Chairman ELLENDER. You also contract with universities.

Dr. FROSCH. We have contracted to universities that we use.

Chairman ELLENDER. That accounts for $756 million of the $2.7 billion for research, development, test, and evaluation. How is the remainder of about $2 billion utilized?

CONTRACTS WITH INDUSTRY: ORIGINATION OF CONCEPTS

Dr. FROSCH. Well, $1.5 billion, almost $1.6 billion, is directly contracted to industrial contractors. That is directly from headquarters for the development of weapons systems, equipment, including the major development items.

Chairman ELLENDER. How is the requirement for that work established?

Dr. FROSCH. The Navy developed, principally through the Office of the Chief of Naval Operations, requirements which amount to statements of need for equipment to be developed for naval purposes. Ideas for how to satisfy these requirements may come from in-house laboratories, may come from people in the material portion of Navy headquarters, may come by proposals from industry, either unsolocited or solicited proposals which we might advertise a need for, and then on the basis of these industrial proposals and in-house ideas, we let contracts or do in-house arrangement for the development of solutions to these problems.

Chairman ELLENDER. You state that $1.5 billion is let on contracts. How do those contracts differ from the amount that you spend in-house, such as the $768 million? Why do you separate these two approaches?

Dr. FROSCH. Well, it is separated in terms of whether the contract is let directly from headquarters or whether the money and the problem are allotted to one of the field laboratories which, in turn, does the contracting. We could do the accounting another way. So, if you like, the total amount being performed by industrial contractors, it is $1.6 billion plus about half of the $768 million, which is about two-something, about $2 billion.

RESEARCH BY NONPROFIT ORGANIZATIONS

Chairman ELLENDER. How do you expend the rest of your money?

Dr. FROSCH. There is about $57 million which is performed by nonprofit organizations as distinguished from profitmaking and so on.

CENTER FOR NAVAL ANALYSES, UNIVERSITY OF ROCHESTER: PERSONNEL AND RESPONSIBILITIES

Chairman ELLENDER. Those are the so-called "think-tanks."

Dr. FROSCH. It would include the Center for Naval Analyses run by the University of Rochester.

Chairman ELLENDER. How many people do you have there?

Dr. FROSCH. At CNA, I believe there are about 50 officers assigned.

Chairman ELLENDER. What work do they perform?

Dr. FROSCH. They participate in analysis work as the representative of the Chief of Naval Operations and they are the links between the analytical work that is done there and the Navy's requirements for that analytical work and this is specifically because the kind of thing they do for us causes a situation——

Chairman ELLENDER. Are they a type of inspector?

Dr. FROSCH. No, they are not inspectors in that sense. They work there, both, on the work, but as representatives of the Chief of Naval Operations, and they are a military link between the Navy and the work being done.

Chairman ELLENDER. What is their authority in directing the work?

Dr. FROSCH. In some cases, they are in charge of a specific study and in some cases they are only working on the study and performing liaison work with the Office of the CNO.

OFFICERS ASSIGNED TO RESEARCH AND DEVELOPMENT

Chairman ELLENDER. It has been my contention throughout these hearings that one of the principal methods of reducing Defense expenditures is through the reduction in personnel. Many military personnel are assigned to what are essentially civilian positions. I was astounded last week to learn that 34,300 military personnel in the three services are used in research and development work. Of these, over 10,000 are officers.

Dr. FROSCH. The greatest bulk of people doing Navy R.D.T. & E., in-house, which is a relevant number, are civilian personnel. The number in the laboratory community of civilian servants is 25,000, approximately that are paid for by R.D.T. & E., N. and then 13,000 are not paid for by R.D.T. & E., N., but paid from other appropriations.

Chairman ELLENDER. Mr. Woodruff informs me that the entire number of military personnel employed in Navy R.D.T. & E. is 7,841, of which 1,346 are officers.

U.S. RESEARCH ACCOMPLISHMENTS AND PROCUREMENT EXPENDITURES VIS-A-VIS RUSSIA

I reiterate my statement of a few minutes ago. It is incomprehensible to me why, with such large expenditures and so many personnel engaged, the United States should lag behind Russia in military preparedness, as Admiral Zumwalt has indicated.

Dr. FROSCH. I think what Admiral Zumwalt is saying, and I have heard him say this before, is that there was a period in time in which we didn't buy enough Navy equipment, whether we had developed it or not, and so we are well behind in ships and equipment purchased, not so much in development, although there are areas where we have not done enough development and are trying to catch up. I think most of Dr. Foster's worries about relative technological capability between the United States and U.S.S.R. are predictive of what will happen if the current spending curves, as he estimates them for the Soviet Union, and as we know ourselves to be, continue.

I don't think that it is the case that we have not produced many things from R.D.T. & E.. I think we produced a great many things, although a number of them are not single major weapons systems that we can point to and give a name and account to. We have made major changes in the way our weapons systems operate and the way in which the whole fleet operates.

I think what is being said is that we have not been doing enough and perhaps not well enough and that is not the same as we have not been doing anything.

To support my statement, I would like to insert into the record at this point a list of major systems entering the inventory during the past 15 years.

(The information follows:)

MAJOR SYSTEMS ENTERING OPERATIONAL STATUS IN PAST 15 YEARS

CY IOC System:

57—P–2H Aircraft.
57—MK–43 Torpedo.
57—A–4B Aircraft.
58—Nuclear Bomb B28.
58—Nuclear ASW Depth Bomb W34.
58—S5W Submarine Nuclear Propulsion Plant (1 Reactor).
58—FPS–16 Radar System.
58—SSQ 23A JULIE SONOBUOY.
58—WRT–2 Single Side Band Transmitter.
58—BQS–4 Sonar System.
58—TALOS Missile System.
59—SQS–23 Sonar.
59—JEZEBEL/JULIE/Improved MAD.
59—F–8C Aircraft.
59—E–1B Aircraft.
59—WLR–1 Countermeasures Receiving Set.
59—C4G Submarine Nuclear Propulsion Plant (2 Reactors).
60—SUBROC.
60—Bullpup A.
60—MK–45 Torpedo (ASTOR) and MKX44 Torpedo.
60—S1C Submarine Nuclear Propulsion Plant (Turbo-Electric).
60—MK–113–SS Fire Control System.
61—SPS–32 & 33 Radar.
61—SQS–26 Sonar.
61—F–4B Aircraft.
61—SH–3A/D Helo.
61—APQ–72 Fire Control System.
61—Nuclear Bomb B–43.
61—Nuclear ASROC W–34.
61—C1W Large Ship Nuclear Propulsion Plant (2 Reactors).
61—A2W Large Ship Nuclear Propulsion Plant (8 Reactors).
61—FPQ–6 & TPQ–18 Radar Systems.
61—SSQ–28 Sonobuoy.
62—Polaris A2.
62—HU–2K Helo.
62—P3A Aircraft.
62—SQQ–14 Sonar.
62—BQS–8 Sonar.
62—D2G DD Type Nuclear Propulsion Plant (2 reactors).
62—ULQ–6 Ship Deception Jammer.
62—ALQ–51 Airborne Deception Jammers.
63—Navy Tactical Data System.
63—MK–52 Mine.
63—A6A Aircraft.
63—Homing Terrier (HT).
63—TARTAR IT.
63—RA–5C Aircraft.
63—S–2E Aircraft.
63—DASH Drone.
63—Nuclear ASW Depth Bomb B57.
63—TACAMO.
63—MPS 25 Radar System.
64—MK–55 Mine.
64—Bullpup B.
64—E2A.
64—SHRIKE.
64—POLARIS A3.
64—CH–46 Helo.

64—P3B Aircraft.
64—SPS–42 Radar.
64—SQS–35 IVDS Sonar.
64—Nuclear SUBROC W55.
64—Towed Fish (Deep Ocean Search Equipment).
65—Mine MK56.
65—Torpedo MK–46.
65—Sadeye.
65—Sparrow III (AIM 7–E).
65—Airborne Tactical Data System (ATDS).
65—EA6A Aircraft.
65—RF4B Aircraft.
65—CH–53 Helo.
65—W–2 F1 Aircraft.
65—SSQ–47 Active Sonobuoy.
65—Type 15 Periscope.
65—AWS–13 Sonar.
65—SSQ–38A & SSQ–48 Sonobuoys.
66—Marine Tactical Data System.
66—C–2A (COD) Aircraft.
66—SIDEWINDER IC.
66—A–7A Aircraft.
66—Destructor MK 115.
66—SPS–48 Radar.
66—SQS–38 Sonar.
66—SOLRAD Satellite.
66—SLQ–12 Jammer.
66—Bulleye System HF/DF.
66—CHECKROTE RADAR SYSTEM.
66—SSQ–41A & SSQ–47 Sonobuoy.
67—Satellite Communication System.
67—Curv II.
67—Basic Point Defense Surface Missile System.
67—Weteye.
67—Walleye.
67—Automatic Carrier Landing System.
67—Navy Space Surveillance System (NAVSPASUR).
67—AWG–10 Fire Control System.
67—MSD Drone Boat.
67—APR 25 & 27 Airborne Missile Launch Warning System.
67—BQS–8.
68—OV10A Aircraft.
68—Standard ARM.
68—Navy Navigational Satellite.
68—5''/38 Rocket Assist Projectile.
68—Talos ARM.
68—Helo Trap Weapon.
68—Rockeye II.
68—538 IR Fuze.
68—Aims–MK–X11 IFF System.
68—Trim (AP2H) Aircraft.
68—SPS 54 & 55 Radars.
68—ASW Ship Command and Control System.
68—A6B Aircraft.
68—F4J Aircraft.
68—Destructor MK–36/40.
68—Type 16 Periscope.
68—Nuclear Bomb B61.
68—Igloo White System.
68—New Jersey EW Reactive System.
68—APR–30 Airborne Missile Launch Warning System.
68—ALQ–100 Airborne Deception Jammers.
69—Standard Missile.
69—Snakeye.
69—Beartrap [deleted] System.
69—Omega Navigational System (R&D complete—entire system operational in 1975).

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69—AWS–14 Sonar.
69—MK–103 Airborne Mine Sweeping Gear.
69—S5G Submarine Nuclear Propulsion Plant.
69—A6A Radar Beacon Forward Air Controller.
70—Threat Reactive EW System.
70—Helo Decoy System.
70—ANEW ASW Avionics System (P–3C Aircraft).
70—A–6C Aircraft.
70—Difar.
70—APS–81 Mad.
70—APS–115 Radar.
70—VP TSC.
70—WLR–6 ESM System.
70—WLR–8 Intercept Receiver.
70—SQR–14.
70—SSQ–53 Difar Sonobuoy.
71—Shipboard Satellite Readant Equipment (SROE).
71—WLR–9 Sonar Intercept Receiver.
71—Standard ARM.
71—Dixie.
71—CH53A Mine Sweeping Helo.
71—RH–3A Minesweeping Helo.
71—MK–105 Airborne Minesweeping Gear.
71—BSQ–3 Intrepid.
71—BQS, 13, 15, & 19 Sonar.
71—BRD 7 Radio D/F System.
71—BLR–10 ESM System.
71—SRN–9 Satellite Navigation System.
71—BQG–15 Radar.
71—ITASS.
71—BQG–2/4 Puffs Sonar.
71—Poseidon.
71—MK–27 Target.
71—BQR–15 & 20.
72—BQH–4.
72—MK–48–1 Torpedo.
72—BNU–1 Buoy [deleted].
72—MK–30 Mobile ASW Target.

PERSONNEL REQUIREMENT

Chairman ELLENDER. I have found it in almost any walk of life that a minimum number of personnel usually do better than an excess number. Too many people tend to solidify in layers of bureaucracy in which it is difficult to determine where the buck stops. I question the need for so many officers and enlisted personnel in R. & D. work when so much of the work is done under contract.

Please provide the information we have discussed, including the rank of the individuals.

(The information follows:)

The 6,475 military personnel I have mentioned is the average number (man-years) estimated to be engaged in RDT&EN effort in Navy laboratories and facilities in FY 1973. The 7,841 military personnel number which Mr. Woodruff gave you is the estimated end-strength for FY 1973, including military personnel manning RDT&E project ships as well as military personnel to be stationed at RDT&EN laboratories, of which approximately 500 are not engaged in RDT&EN work.

A summary table of the military personnel planned for assignment to Navy RDT&EN programs for FY 1973 (end-strength) follows:

Rank/Grade	Naval Laboratories and R&D Facilities	Test and Evaluation Facilities	RDT&EN Project Ships	Total
Rear Admiral	2	2	-	4
Captain	78	40	1	119
Commander	143	112	4	259
Lieutenant Commander	194	160	9	363
Lieutenant	174	192	14	380
Lieutenant (J.G.)	46	63	15	124
Ensign	8	8	9	25
Warrant Officer	14	52	6	72
Total Officers	659	629	58	1,346
Enlisted	1,564	4,242	689	6,495
Grand Total	2,223	4,871	747	7,841

The military man plays an important role in RDT&E either as a direct participant or, more important, as an interpreter of military requirements. The military scientific and engineering officer serves as a link between the world of science and technology and the world of military affairs and is capable of acting in both. A description of the functions of military personnel in laboratories, test and evaluation activities, and project ships follows:

A. Laboratories. Military personnel provide three areas of support at the laboratories. These areas can be generally classified as command/administration, operations, and technical programs support. The first area is composed of functions common to most naval activities such as command, security, communications, supply, and public works. Most of the working level functions are performed by civilians with a military department head.

The second area, operational support, is that dealing principally with providing watercraft and aircraft services to the RDT&E effort. The projects now in progress at the R&D laboratories require extensive support by boats, service craft, and aircraft. The R&D laboratories must therefore have adequate military manpower to provide these needed services. Additionally, these support functions are utilized to enhance shore opportunities and to provide equitable rotation for enlisted personnel.

The third area of support, technical programs, is an area peculiar to the R&D laboratories. The officers assigned to this function are the primary source of naval knowledge to the various civilian technical departments at the laboratories. These officers have the responsibility of interfacing technical programs to Fleet improvements and Fleet requirements to technical programs. These officers must have a broad background of Fleet experience and adequate knowledge of science and technology in the discipline they are supporting, to properly understand and interface with the civilian scientists and engineers. The importance of these Naval Officers to the success of the entire Navy Laboratory system cannot be overemphasized. These officers bring to the civilian scientists and engineers in the laboratories an immediate source of experience in naval warfare and comment and provide input on the adaptation of technology to ship and aircraft platforms.

A percentage distribution of military personnel by area of support is provided below:

	Officers	Enlisted	Total
Area 1, Command/Administration	30%	.0%	6%
Area 2, Operations	28%	99.5%	86%
Area 3, Technical Programs	42%	.5%	8%
	100%	100.0%	100%

B. Test and Evaluation Activities. The economical and efficient accomplishment of the Test and Evaluation (T&E) missions of our T&E activities and supporting ranges requires a balanced work force of civilian, officer, and enlisted personnel. In addition, military personnel possess and maintain operational skills and professional backgrounds which are unavailable in the civilian labor market for example, current naval pilot and flight crew qualifications and aircraft carrier landings. Functional areas where a balanced mix of military personnel are required include:

Command
T&E Project Execution
T&E Support (Technical, Supply, Maintenance and Administrative)
Specialized Training
Development of T&E Concepts
Range Control and Operations

Assignment of military personnel to T&E activities brings in operational experience direct from the fleet while simultaneously giving the Navy an opportunity to rotate its personnel thru Shore Station billets with a resultant broadened experience base for having worked in T&E jobs.

C. Project Ships. Military personnel in this line item man the RDT&E project ships such as the USS GLOVER (AGDE-1), USS DOLPHIN (AGSS-555), USS PLAINVIEW (AGEH-1) and the NR-1. Much of the ship services required to support the Navy RDT&E program are obtained by use of civilian-manned ships operated or chartered through the Military Sealift Command. However, where the ship itself is the object being evaluated (as in the case of the hydrofoil craft) or where especially configured test platforms (such as submarines or weapons launching ships) are required, military manning is necessary to carrying out military functions. In many developmental programs, the interaction of the test vehicle with the human operators is a key ingredient. This calls for manning by a military crew typical of the ultimate operator of the final product.

ANTISUBMARINE WARFARE

Dr. FROSCH. Within the naval forces of the future, surface effect ships may provide the means to move ASW sensors and weapon launchers as well as transport large numbers of men and quantities of material and supplies at vastly increased speeds. Air cushion amphibious assault landing craft, major caliber lightweight guns, and guided projectiles will provide superior over-the-beach capabilities, shore bombardment, and ship-to-shore support. Our development of active and antiradiation missiles and electronic warfare decoy and jamming systems will give our surface ships both a lethal offensive and a threat reactive defensive capability. V/STOL aircraft and LAMPS will add a new air capability dimension to the small units of our operational forces. Improvements in detection devices and submarine-launched missiles will increase both our offensive and defensive posture in ASW and undersea warfare. Our efforts in space will be of benefit to all of our units—air surface, and subsurface—and the ULMS program and improvements in strategic communications will assure the Navy's continued effective contribution to the Nation's strategic deterrent capability.

MANAGEMENT INNOVATIONS: EXTENSIVE USE OF ADVANCED PROTOTYPING IN DEVELOPMENT AND REPROGRAMING OF 1972 FUNDS

Several new and innovative procedures have been instituted in Navy R. & D. management. Following SecDef guidance concerning the acquisition of major weapon systems, we are starting to make more extensive use of advanced prototyping in the development process. In response to congressional invitation, we have requested authority to reprogram $10 million in fiscal year 1972 to permit initiating these prototype efforts. Our fiscal year 1973 proposed budget includes follow-on funds to these beginnings. I am hopeful that this approach will produce a wider variety of new program capability options prior to formal commitment to development. The idea, as you know, is that we stimulate the ingenuity of industry and our government teams to develop new, better, faster, and cheaper hardware solutions to military problems.

INCREASED TESTING AND EVALUATING

A second initiative is the emphasis being placed on testing and evaluation prior to committing ourselves to major production. In recent years, we have obviously overestimated our ability to predict and solve all our problems and depended too often on paper studies for the solution. The new emphasis on early testing is working its way into all development projects.

DETERMINATION OF WEAPON AND EQUIPMENT LIFE-CYCLE-COST-SAVING COMPONENTS

In a related initiative, efforts were undertaken in fiscal year 1972 to establish an R.D.T. & E. project to improve the reliability of certain weapon systems and equipment. This R.D.T. & E. investment is designed to reduce O. & M. costs downstream. The effort was initiated to study operational, or very soon to be operational, systems in order to

determine those critical components having a potential for significant life cycle cost saving.

LOW COST EW SUITE

The low-cost EW suite initiative is designed to exploit the notion that we should design to a price and determine the performance which can result.

IMPROVE RELIABILITY OF SPARE PARTS AND MAINTENANCE TRAINING

Chairman ELLENDER. Can you give us examples of the type of projects you would undertake in R. & D. to reduce the cost of O. & M.?

Dr. FROSCH. One of the major costs in operation and maintenance, not necessarily exactly in that appropriation, but as a general concept of operation and maintenance, is cost of spare parts, cost of manpower and training in order to maintain the things that are at sea, and the numbers and kinds of spare parts we have to stock in the whole logistics flow of them and of the training problem, which is critically dependent on how reliable and what kind of reliability we can build into our equipment.

We are trying to do as a kind of pilot project, to understand how to do it better, are trying to pick certain pieces of equipment we have reliability problems with and learn how to improve them so that we can get better reliabiilty and have less of a spare parts problem and maintenance problem in the fleet.

Inasmuch as over the life of the project or life of the weapons system in the fleet, it is those costs of unkeep and maintenance that tend to dominate and by putting more money into development and learning how to improve, we expect to save a lot of money.

F–4J AIRCRAFT AVIONICS

Chairman ELLENDER. How are you progressing with that?

Dr. FROSCH. We have just begun to do this. We have several examples that are quite clear and we can make major improvements, one in avionics of the F–4J aircraft. We are beginning to understand how to greatly improve reliabiilty of that equipment.

1,200 POUND STEAM BOILER

We are undertaking some major work on the 1,200 pound steam boiler, which has been a maintenance problem for a long time in the fleet. It is not quite so clear how we will be able to proceed on that.

UHF RADIO TRANSCEIVER

As another kind of example, we have taken a UHF radio transceiver which has been a maintenance problem to try to see how to upgrade that and drastically cut down on the amount of maintenance and costs. We are going to expand it as we learn how to do it better.

PROGRAM INITIATION AND FUNDING

Chairman ELLENDER. When was that program started?

Dr. FROSCH. Well, it was really intended that it would start in 1972, this year.

Chairman ELLENDER. In 1972? How much have you allocated so far?

Dr. FROSCH. Well, this is in, or the principal money for it is in the supplemental. We have reprogramed and allotted to the programs I mentioned just under $2 million. That work has begun this year.

Chairman ELLENDER. How much are you requesting in this appropriation to continue that work?

Dr. FROSCH. $5 million.

Chairman ELLENDER. Proceed.

R. & D. SUPPORT OF PERSONNEL AND TRAINING

Dr. FROSCH. Another area in which initiative is being exerted is in R. & D. support of personnel and training.

Chairman ELLENDER. This is not new, is it?

Dr. FROSCH. We have been doing research over the years on how to train our people better and select people for particular kinds of training better and it turned out we have some ways to do it that are more efficient than those used in the past, that has enabled us to achieve certain levels of training with shorter courses and retain people in the programs better.

Chairman ELLENDER. Who does the actual research?

Dr. FROSCH. Some is done by the inhouse laboratory which is a personnel laboratory in San Diego and there is a smaller personnel laboratory in Washington and a small neuropsychiatric laboratory that does some training work and some work is contracted out.

Chairman ELLENDER. Proceed.

SURFACE EFFECT SHIPS: DELAY IN TESTING 100-TON TESTCRAFT

Dr. FROSCH. I will skip to the bottom paragraph on page 10.

I have noted that some significant strides were taken in the past year. We have had our share of disappointments. For example, we have experienced delays in the testing of the 100-ton testcraft under the "Surface effect ships" program.

Chairman ELLENDER. Can you tell us why that is? You were supposed to test the 100-ton surface effect ship last fall.

Dr. FROSCH. Yes. When they put together the transmission, the shafting and gear boxes that would transmit the power from the main engine down to the propeller in that particular test craft and ran it up, some of the machinery broke very simply and they had to go back and had to reexamine the entire design for the conditions that they measured in the ship when they actually put it together and had to remanufacture part of the transmission.

As you may know, that boat has subsequently flown. In fact, on the 26th of February, it flew at 40 knots and I think a little later we have a film clip of that boat flying at 40 knots.

The other boat, which is being built in Seattle, or in the Tacoma area, has had some, also, engineering problems and management problems with the contractor, and the contractor changed the entire management team, and I think he has gotten over some problems; but that boat probably will not fly until April or May. So at the time you were down in New Orleans with Admiral Zumwalt, we were with that contractor pretty well over the difficulty and about ready to begin flying.

1973 Program Funding

Chairman Ellender. How much more money is requested for those two boats?

Dr. Frosch. In the fiscal year 1973 request, the line items that cover the entire surface effect ships program is for $50 million, of which $27 million is to be allocated for the beginning of design and the construction of a 2,000-ton craft, later, or in the last half of fiscal year 1973, and about $5 million, I believe, is allocated to the technology that is generally associated with this area and for each of the contractors involved there is $4.5 million allocated for further testing of these 100-ton craft and for modifications that might need to be made and tested in the craft and inhouse we have allocated $1.5 million for Navy associated costs in testing the craft.

Chairman Ellender. Please describe this procedure.

Dr. Frosch. Well, after a period under contractor tests, the Navy will take over these craft and begin to do operational type testing, which is testing under more operational conditions and it will be done with Navy people and facilities at Patuxent, so there is some money for that test equipment and for paying for that test program.

Chairman Ellender. Don't proceed too rapidly on the 2,000-ton craft, because there is an agreement with the committee that not a nickel will be spent until the other craft are fully tested.

Dr. Frosch. I absolutely agree with that. I know the agreement and I am completely for it and we do not intend to do any real detail design on building on the 2,000 ton until we have thorough tests on the 100 ton. I believe it would be prudent to do some preliminary examination and preliminary design work on the 2,000 tons while we are testing 100 tonner's, so we can get the characteristics of the generalized design affecting the testing of 100 tonners.

Program Expenditures

Chairman Ellender. Will you provide for the record how much money has been spent on each of these two boats, the one in New Orleans and the other in Tacoma?

(The information follows:)

The amount expected to be spent on each SES 100 ton testcraft through FY 1972 is $21.1M on the Aerojet craft and $19.2M on the Bell craft.

Estimated Cost of 2,000 Ton Boat

Chairman Ellender. What is your estimate of the cost of the 2,000-ton boat you expect to construct?

Dr. Frosch. I think I will have to supply a total cost estimate for that for the record. I only have the amount for fiscal year 1973.

(The information follows:)

The estimated cost for one 2,000 ton SES prototype is estimated to be [deleted]. When mission equipment is installed it is estimated that [deleted] in additional funding will be required.

Funding of Program Components

Chairman Ellender. I have a note here that in the request of $80.1 million for the program element entitled "Surface platform, advanced," $50.1 million is included for the continuation of the surface effect ships program. This $50.1 million is for the following purposes:

100-ton prototype program, $10.5 million; 2,000-ton prototype program, $28 million; concept technology, 22 projects, $8.7 million; project office expense, $1.5 million; and design criteria, $1.4 million. Please comment on those items.

Dr. FROSCH. There is the money, which is the $10.5 million, which is specifically connected with the two existing 100-ton testcraft, their contractor's trials and Navy trials, and there is $28 million allocated to design and the beginning of construction of 2,000-ton ships when we have done enough test work so that we are ready to do the detailed design and construction. The remaining amount of money is for technological work and for analytical work and for management, which is generally applicable to the whole surface effect ship work of this kind, but is of a nature where we cannot allocate it conveniently either to 100-toner or 2,000-toner, but this is the general technology connected with the problem—hydrodynamic work, some work on fans and the aerodynamics inside of the bubble of the ship, work on other propulsion and transmission and engine designs that would go to the general class of ship but is not specific as to any particular size.

CONCEPT TECHNOLOGY: 22 PROJECTS

Chairman ELLENDER. What do you mean by "concept technologists, 22 projects, $8.7 million"?

Dr. FROSCH. Well, this includes aerodynamic and hydrodynamic work I mentioned, and looking at other kinds of designs, sidewalls and front seals, making measurement of hydrodynamic resistance of various kinds of designs, and analysis of stability of ships of various shapes and sizes.

Chairman ELLENDER. How is this related to the 100-ton prototype program?

Dr. FROSCH. Some of the data from the 100-ton testcraft will be used in this effort.

Chairman ELLENDER. It was my position last year that we should not proceed with work on the proposed 2000-ton ship until you have fully evaluated the two 100-ton ships. I recall that one of the purposes of the two 100-ton ships was to evaluate two different types of propulsion systems, and of course this has not been accomplished.

Proceed.

Dr. FROSCH. These ships were to begin testing last summer. We have, we believe, overcome the obstacles. In one case, transmission qualification test failure and related enginering problems, and in the other case, contractor program control, staffing and management difficulties prevented our proceeding on schedule. We now expect to commence the tests of the Bell craft in February 1972 and the Aerojet testcraft in the spring of this year.

I think we have film clips that show that speed of the Bell testcraft underway in the first test run doing about 8 to 10 knots.

There is some problem there, leakage from the seal on the starboard side, but it is good on the port side. I think there is also a film clip at the end of this one of the 40-knot run, which was quite significant because of the fact they were able to get up to 40 knots easily, meaning that the optimistic, the much more optimistic predictions of performance were correct, and not the pessimistic ones. You can see the big waves kicked up by the semisubmerged propellers.

This is a 40-knot run and, as you can see, it is calm water, and I think it is in the canal, Senator, but the stability of the craft in that operation in its first run at 40 knots gives us a good deal of sort of initial confidence that the ship may be a good one, so we have our first important testing milestone on this.

Ship Speeds

Chairman Ellender. Is the principal virtue of this kind of ship its speed?

Dr. Frosch. It is a double virtue. One virtue is it goes fast and the other is that we believe it will be able to go at very high speeds under Sea State conditions, under wave conditions, where an ordinary hulled ship cannot go. We expect we will be able to do with this vessel, a 2,000 toner, will be able to go, if predictions are right, something between 80 and 100 knots in Sea State 5, which is fairly significant, well, Sea State 3 or 4, at any rate, at that high speed, and that is a capability we don't know how to achieve in a multithousand-ton ship in any other way and that is the interest in going in this direction.

Chairman Ellender. How would the 2,000-ton ship you contemplate designing be used by the Navy?

Dr. Frosch. This ship we would intend as a testcraft so it would not be an operational ship ever.

Chairman Ellender. You are speaking of the 2,000-ton ship?

Dr. Frosch. 2,000 ton, that is right. We need to go to tests on that scale before we can have assurance in going to production of the ship.

Anticipated Missions

Chairman Ellender. What is your objective?

Dr. Frosch. Well, we see a number of possible missions for this ship. They include ASW escort situations in which such a ship can take advantage of its high speed to go to a place where a projection has been made by some other means and capabilities on that with good endurance. We see it as useful in some logistics tests in moving high-value cargo and people at very high rates across the ocean. We see it as being useful in antisurface ship escort work, because it can move in, deliver a punch, and move out at a high rate of speed.

So there are a number of missions that are destroyer-like in their characteristics, escort-like, so it will go at this kind of speed and high sea state capability would be particularly useful.

Now, there are some possible uses for it in connection with launching aircraft. But we really don't understand very much about that yet.

One of the points about the high speed is that a ship that is going at that speed is going something like two and one-half times, or at least twice what we believe to be the highest speed that we could contemplate building a submarine to go.

So, with its characteristics in ASW and its lower vulnerability, interception might get to be doubled.

Chairman Ellender. Would it be used to carry freight?

Dr. Frosch. That would be one use but we are more interested in using it as an antisubmarine vehicle to capitalize on long-range detections by getting to datum and doing the local search, location and kill.

Chairman ELLENDER. Such a ship as this would be employed in discovery and attacking hostile submarines?

Dr. FROSCH. Yes, given some information, it would go to the place where the information was and do the rest of the attack.

OPERATIONAL DATE AND DEVELOPMENT COST

Chairman ELLENDER. What is your target date for operation of a ship of this kind?

Dr. FROSCH. Not before the end of [deleted], kind of the earliest I would estimate.

Chairman ELLENDER. How much will you spend in the meantime?

Dr. FROSCH. If we get satisfactory test results from the 100-ton craft and if we decide that we require, say, two 2,000-ton test vehicles, which might be a prudent way to proceed, and we carry that out and all of the testing that we estimate, then the development out through, well, 1977 or 1978 would probably cost about [deleted] million.

Chairman ELLENDER. All right.

COMPARISON WITH HYDROFOIL SHIP

Senator ALLOTT. Mr. Frosch, do you differentiate between the possible uses of this ship and a hydrofoil, and when you would expect to go one way or the other?

Dr. FROSCH. Well, they have somewhat different properties. The hydrofoil has its best speed range somewhere around the 40- to 50-knot area, most efficient speed range. With a surface effect ship in the large size, it gets its best efficiency range somewhere between 80 and 100 knots. There is another distinction. We think we can build surface effect ships in a multithousand ton size, 2,000 tons is probably not the limit, and we might be able to go as high as 10,000 tons if the theoretical studies are correct. We don't really see how to make hydrofoils that are bigger than about 1,000 tons now. So we expect that if the hydrofoils are going to be useful in places where a craft of, say, up to a few hundred tons would be useful at about 50 knots, whereas these ships we would end up building as large, full seagoing ships, with very high speed capabilities in high Sea State and in that sense they are not directly competitive because the hydrofoils will probably end up, most certainly as far as now planned, end up in what we might call high-speed high Sea State gunboat missions, surface-to-surface missile launching and direct attack, largely in-shore or places like the Mediterranean where you are never very far away from land, whereas surface effect ships are likely to become full scale blue water combatant and/or logistics ships that would operate with the fleet essentially anywhere in the oceans. So in that sense, it is not a direct choice between two things which have the same properties and do the same things. They would come into the fleet, if they both come into the fleet, for different purposes and on a different scale.

MULTIPLE USE OF SHIPS IN LIEU OF MULTIPLICITY OF SHIPS

Senator ALLOTT. I asked this question because one could ultimately refine these things to a point where one would have 100 different ships to perform the varying capabilities between a hydrofoil and what you would say the surface effect ships can be. However, we, in this coun-

try, must make some very hard decisions about our defense, which is what this committee is trying to do, and I don't think we can afford to develop a ship for every possible use on the sea.

I think we must work toward multiple uses and this is the reason I asked this question.

Dr. FROSCH. I think it is a very reasonable question and it is perfectly correct, a correct point, and one we are concerned with.

TECHNOLOGY VARIANCE IN PROGRAMS

There is another difference in the timescale. In the 150- or 200-ton class of hydrofoils, we have the technology now and so we are preparing to build some for the fleet. The SES, as I indicated, we don't believe will have the technology until a later decade, so we don't have options to put them in the fleet now.

HYDROFOIL LANDING CRAFT: CAPTURED AIR BUBBLE SHIP

The only exception is in the landing craft size and they, of course, as you know, were doing development work with the soft-sided captured air bubble vehicle we usually call them, that might be used for landing craft, and they will have a capability of going directly up to the surf on the beach, which you can't do with a hard side or hydrofoil, and we are talking there of craft that are in the 100-ton range as finally developed craft.

Senator YOUNG. What was the last thing you said?

Dr. FROSCH. We are talking about craft in the 100-ton range as the operating craft of the Marine Corps and that is in development.

Senator YOUNG. What kind of ship would it be?

Dr. FROSCH. I think we would call it a captured air bubble ship or it has the soft fabric around it rather than the hard side wall of a surface effect ship. Air cushion vehicle.

TONNAGE VARIANCE

Senator YOUNG. What tonnage of both surface effects ship and hydrofoil do you believe possible?

Dr. FROSCH. A surface effect ship with the hardside walls, the kind we had a film clip of, we believe we can get up to a multithousand ton ship, maybe as high as 10,000 tons. With the hydrofoil, the most ambitious engineers are considering we might get as high as 1,000 tons but not higher. With the soft-sided air cushion vehicle, which is really resting on a balloon or half balloon, we are talking maybe in 200 tons maximum.

TESTING OF MOTOR CRAFT

Chairman ELLENDER. As I understand it, you are testing motor craft. One is operated by air and the other is operated by water jet.

Dr. FROSCH. That one that is operating in New Orleans has propellers which are half in the water and half out of the water. The one which is in Tacoma will have a water jet. It takes in the water underwater and pushes it out the stern. We have used it for a small hydrofoil before.

Chairman ELLENDER. Have you any idea which propulsion method will be used in the new design?

Dr. FROSCH. That is why we want to test the 100-tonner, to help us decide.

PENDING PATROL FRIGATE REPROGRAMING REQUEST

Senator YOUNG. Mr. Chairman, isn't there a reprograming request for an additional $8 million during fiscal year 1972 on surface effects ship project.

Chairman ELLENDER. Not for the surface effects ship program. There is an $8 million reprograming in connection with the patrol frigate program.

Senator YOUNG. That is the one I had in mind, Mr. Chairman. Just what is the need for the additional $8 million for the patrol frigate?

Admiral MOORE. To continue the conceptual design for the patrol frigate, which is in the fiscal 1973 budget. There is a request for one ship. The Navy has not initiated contract design at this time, but there is a program of conceptual design totaling $11.7 million in fiscal 1972, $3.4 million has been appropriated previously in research and development and we are asking for reprograming of an additional $8.3 million.

Senator YOUNG. Is that urgent?

Admiral MOORE. Yes, sir; it is. It is on-going work now for this program for the balance of the fiscal year.

Senator YOUNG. What would happen if it is not approved?

Admiral MOORE. There is the difficulty of supporting the inhouse design team. In other words, the small amount of money appropriated for the program, $3.4 million will not carry the team effort for the balance of the fiscal year; the $8.3 million is needed to continue the conceptual design effort.

DENIAL OF AUTHORIZATION BY ARMED SERVICES COMMITTEE AND UTILIZATION OF R & D FUNDS FOR ADVANCED SHIP DESIGNS

Senator ALLOTT. Mr. Chairman, may I ask a question?

Doesn't this mean that you assembled a design team which you had not budgeted for and not funded?

Admiral MOORE. When this PF program was presented to the Congress about a year ago, there was a budget amendment proposal for some $51 million, to initiate the design effort and provide for some advance procurement. It was determined by the Senate Armed Services Committee that it was not desired to take up this program until such time as more information was available on the PF. Therefore, the budget amendment was not entertained at that time. However, there is money in the Research, Development, Test and Evaluation program each year for advanced ship design. The need for an escort type, a new ship, has been recognized in the Navy, and funds are being requested for the construction of the lead ship in fiscal 1973. Therefore, there has been a continuing effort pointing to having conceptual design completed by the 1st of July, in order that we can go to contract design, with a number of contractors on the 1st of July, and then to proceed with the award of a contract for a ship in fiscal 1973.

We have an ambitious program to accelerate this effort. We have had a reprograming request for $8.3 million to continue the effort for the balance of this fiscal year. It is a program of high priority to the Navy.

Senator ALLOTT. Well, I just made the point, Admiral, that you had $3.4 million as I understand it.

Admiral MOORE. $3.4 million specifically earmarked for this effort.

Senator ALLOTT. For conceptual design?

Admiral MOORE. Yes, sir.

Senator ALLOTT. You put together a team. You give as your reason now that you would have to break up your design team before the end of the fiscal year. So what you did was put together a design team to do something that Congress had not given you the money for, depending upon the idea that you could reprogram money later, is that it?

Admiral MOORE. This is inhouse effort at our Naval Ship Engineering Center where a group of people have been working on a concept design for a PF. We have limited resources appropriated this year to continue a program which would prevent about a 12-month delay in the award of a contract for this ship. We have gone with conceptual design to the limit of funds presently available. If the additional money is not available, that inhouse design effort on this particular project will cease.

Dr. FROSCH. This does not involve hiring people, but taking in-house people and assigning them to this work. When the money runs out, if there is not additional money, they will be assigned to other work for which there is money.

USURPATION OF CONGRESSIONAL APPROPRIATION AUTHORITY

Senator ALLOTT. I think I understand the situation perfectly. But it occurs to me, with Congress being in session most of the year, that if you were planning on going ahead at this rate—and, frankly, what I say does not relate to my ideas about the PF, because I think it is needed—but it is one of the ways that Congress constantly loses control of its legislative appropriative process. You say, "We didn't go outside," but you put many men from another area to work on this at this rate of acceleration. Congress gave you $3.4 million, but suddenly it is $3.4 million plus $8.3 million, which is $11 million that is required over most of which Congress has no control whatsoever. I just make the point and that is all I have to say about it, Mr. Chairman.

INTERAPPROPRIATION FUNDING OF SHIP DESIGNING

Chairman ELLENDER. Well, personally, I don't like the idea of using funds in R. & D. for ship design. Sometimes you use R. & D. money in design, and sometimes you use the money appropriated for shipbuilding for design work. Why not provide it from one or the other?

Admiral MOORE. I will agree that there are historical examples where the entire design effort has been in the shipbuilding and conversion appropriation. We are not going to contract design for this ship with this money. Conceptual design has been done using the research development test and evaluation, Navy appropriation; for example, the DLGN program, where essentially all of the initial design effort was in research and development.

On the other hand, we have programs where only a small percentage of the design effort was accomplished in the reasearch, development, test and evaluation program. Our DD–963 class destroyer, has the

smallest percentage of the design effort in R.D.T. & E. but the majority of the effort was done in the shipbuilding and conversion program.

Congressional Intent

I think in this particular instance the express desire of the Congress that the Navy not proceed with a commitment to a shipbuilding construction program influenced the decision that this effort should be done in research and development.

That was one of the influencing factors which caused us to seek the additional funds in the R.D.T. & E., Navy appropriation. There is an annual program in this appropriation which provides for effort in looking at new ship designs.

Chairman Ellender. Proceed.

MK-48 torpedo operational evaluation

Dr. Frosch. Skipping to the middle of page 11, since last year we have conducted competitive tests on the MK–48 torpedo and selected the Clevite version. When we began the operational evaluation we experienced some reliability problems, such that we were forced to suspend the Opeval to investigate them. The problems turned out to be related to the transition from contractor, preparation of weapons to their handling by sailors. We learned much about the crew handling and training necessary to derive the latent capability from the weapon. These problems have now been overcome and the Opeval is proceeding.

Funding Request for Production

Chairman Ellender. What is the current R. & D. status of this torpedo?

Dr. Frosch. It is completing its test and evaluations. The first submarine has been loaded out. We are finishing up the last pieces of development work, principally test and evaluation, but it is fundamentally in production.

Chairman Ellender. You state you are having problems?

Dr. Frosch. We did have some in the Opeval, but we think we have solved those problems. There is one remaining area in which the torpedo is not completely satisfactory although it is better in this area than previous torpedoes and that is in radiating noise. It is noiser than we like and we are doing development work to make changes in production to reduce the noise.

Chairman Ellender. I anticipate that you will be requesting funds in the near future to modify the original production torpedoes. It seems to me that we always go to full-scale production before we have completed the testing program.

Dr. Frosch. I am sure there will be some changes in the torpedo. There are some changes in all weapons systems, even those that have completed all of their testing and evaluation. There are changes in requirements and changes in technology.

Chairman Ellender. Proceed.

Warfare area programs

Dr. Frosch. I will now go to page 13, "Review of R. & D. programs by warfare area."

The individual research and development programs can best be described in terms of the warfare areas they support. Programs I will now discuss have been selected from our total effort because of their importance to our objectives. Additional details on them and on the other programs have been provided in the appendices and supporting data books.

AIR WARFARE

The significant air warfare programs can be grouped roughly into two parts—those new projects which are directed toward maturing the sea control concept of the future and those ongoing programs which are nearing completion and fleet introduction.

SEA CONTROL SHIPS AND AIRCRAFT

In the sea control ships area we have designated the U.S.S. *Guam* as an interim test platform. We will use this platform to study operational concepts and tactics such that we can focus our developments on confirmed requirements. Tests are underway in the USMC to validate the Harrier through intensive operations at sea, as well as from shore sites.

We have a film clip of some Harrier operations on the board.

This is the Harrier in a vertical landing on the flight deck of the *Guam* and there will be now a clip of a short takeoff. If you used this with a short takeoff role it can carry considerably more than if you make a vertical takeoff because there are some circumstances in which we use each capability depending on the military problem.

Senator YOUNG. Will the marines be deployed with this from these control ships?

Dr. FROSCH. Probably not. We would expect that the sea control ship would be Navy Harriers, or Navy-manned, if we use the Harriers on it.

Although we are still discussing the question whether the Marines will deploy with a dual amphibious sea control kind of capability and in these experiments we essentially have asked the Marines to help us do experiments in the use of those aircraft on this kind of ship.

LOGISTICAL CAPABILITY IN EVENT OF WAR

Chairman ELLENDER. What do you mean by the sea control concept? What is the idea?

Dr. FROSCH. Well, if the country engages in any warfare effort which involves either direct support to allies overseas or U.S. troops and aircraft and such, overseas, we have the problem of getting either the support material to the allies or the troops and aircraft overseas, it is simply impossible to fly everything, because of the capacities and the ranges of aircraft, so, for example, if there were to be a NATO war with the Soviet Union, we would have to get petroleum and heavy equipment and economic supplies, and we would have to get troops overseas, so the problem of doing this in the face of an enemy who might want to attack that pipeline, or the pipeline of imports to the United States for military or strategic purposes, this gives the Navy a problem of being able to protect shipping, either going or coming, from submarines, surface and air attacks.

We refer to that as the sea control mission controlling the seas well enough to use it for that kind of logistic operations.

EFFECT OF NIXON DOCTRINE

Chairman ELLENDER. Wouldn't that be in conflict with the so-called Nixon doctrine? Are we going to continue to send men abroad? I thought that South Vietnam gave us a fine example of that.

Dr. FROSCH. What the Nixon doctrine has said, and it is consistent, in fact, it requires the sea control concept, is that we will, particularly with allies who have manpower capability, we will support them in their use of their manpower to protect them, but we will back them up with military and economic aid and with direct military aid where the requirements are for sophisticated aid such as airpower that they cannot supply for themselves, so, therefore, there may be requirements to supply them with military equipment, with economic support, and possibly with fleet support or air support.

The manpower support question comes in directly in connection with NATO which is a separate case from the Nixon doctrine, because of the nature of that alliance to be for direct U.S. support to NATO, and this is a somewhat different case.

Chairman ELLENDER. Proceed.

V/STOL ADVANCED PROTOTYPE PROGRAM

Dr. FROSCH. On page 14, we are midstream in the process of refining our V/STOL advanced prototype program. Two types of aircraft are being addressed—a long endurance sensor carrier which may also deliver weapons against low resistance targets such as surfaced submarines and fast patrol boats, and a shorter endurance, higher performance fighter attack type for air opposition and offensive missions against larger ships and shore targets.

F–14A AIRCRAFT

The F–14A program has made major strides since I last reported to you. For example, eight aircraft are now in flying status and the Phoenix weapon system is being installed in an F–14 at the Naval Missile Center, Point Mugu, Calif. We have just completed a Navy preliminary evaluation (NPE) with the following results: During the 2-week period of phase I, we accomplished 39 flights and some 74 hours of flight time using Navy pilots. This is a substantial achievement in terms of our prior experience with other aircraft developments at the equivalent time in their development. One F–14A achieved four flights in 1 day.

Since the time the statement was prepared, we had an opportunity to review in detail the results of NPE and the purpose of NPE is to determine early our problems so that we can correct them as we go on in the development process.

Compared to other aircraft, the F–14 was excellent at this stage. There were 34 things that were called enhancing features, namely, the recommendation of the NPE pilots was that they could stay in the F–14, and you should consider them for installation or building into any future aircraft of this type.

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Major Deficiences

There were 33 items called major deficiencies and a number of minor ones, and I have to note when an item is tagged as a major deficiency it only means that it must be fixed before the F–14 is accepted in the fleet; it does not necessarily mean it is major in the sense of being overpowering. For example, in the major deficiencies, there were items consisting of location of certain warning lights in the cockpit and items that have to do with fuel control level, I don't remember exactly, but, roughly speaking, had a bend to the left instead of the right, so the pilot has difficulty in reaching it, and a lot of collective items like that.

Engine Stalls

There was one area, a significant problem, that needed correction, having to do with performance of the engine at low speed and high altitude in one corner of the performance envelope, where there was some problem of engine stalls induced by the afterburning light-off and this is a problem that the engine manufacturer feels he understands, and is working on, and it is not untypical of the kind of problem we would expect to find at this stage in the operation.

Film Showing Aircraft Characteristics

I think we have a film clip of the F–14 shown in flight. This is a takeoff.

You might note the horizontal tail there, the entire tail moves as the control surface is stabilized. The boom on the nose of the aircraft is not part of the aircraft, but part of the test equipment to measure airstream characteristics on the front of the aircraft before it has been disturbed by the aircraft.

Here it is with the wing extended, swept forward, and then with a sweep back so it shifts to a configuration which adapts it to the higher speed. It is expected that the capability of changed wing-speed wing-sweep in flight will be a capability that can be used to enhance "dog-fighting" capability in that configuration of the aircraft.

Here is a landing of this aircraft.

B Engine Development

Early problems with the F–401 engine development have been such that the first flight of the F–14 equipped with this engine has been deferred and is now estimated for April 1973.

That first flight will be what is called the B engine. That will be the first developmental engines certified for any flight use. They will not be a production engine because the production engine will come along about a year later, in April 1974.

Senator Young. Is this what you call the B engine?

Dr. Frosch. Yes, the engine that would make the F–14 into an F–14B, and you recall while continuing with the development the current plans were to buy all of the first production of F–14's, that is the 300-some that are programed as F–14A's, but we are still paying our portion of the joint Air Force/Navy development of the F–401 engine.

Phoenix Missile System Testing

Testing of the Phoenix and associated missile control system (AWG–9) is continuing at the Naval Missile Center, Point Mugu. The Navy technical evaluation (NTE) with the F–14 integrated system in aircraft No. 4 is scheduled to begin this spring. The success rate for Phoenix firings presently stands at 27 successes out of 42 firing attempts.

I would like to add a word about NPE No. 1 connected with a Breadboard system that was put in the TA3B aircraft. It is not an F–14, which is flown from Mugu, and here there were a number again of deficiencies that need to be corrected and most cases the actions have been taken and will be evaluated in the next NPE, and in No. 2 there were seen features that were described as enhancing an important improvement. So we are finding things in development that need to be fixed and continuing to test them in our NPE.

Agile Missile Advanced Development

The Agile missile advanced development, under the management of the Naval Weapons Center, China Lake, is progressing in a satisfactory manner. Ballistic test vehicle shots were completed in August 1971. Six preprogramed maneuvering flight test vehicles are scheduled to be fired through October 1972. [Deleted.]

Senator Allott. Is that mounted on a plane?

Dr. Frosch. This is an air-to-air dogfight improvement which is intended to come in after the advance Sidewinder, and is for close aircraft-to-aircraft fighting with very high maneuverability and capability to attack aircraft from more than just a rear aspect.

[Deleted] seeker will be selected [deleted] with transition to engineering development anticipated in [deleted].

Harpoon Antiship Missile System

In the air-to-surface weapons field, our development program for the common air-launched and surface-launched Harpoon antiship missile system is presently in the 2-year engineering design phase which began on June 21, 1971, with the award of a contract to the McDonnell Douglas Aircraft Corp.

Utilization of Television With Radar Seeker

Before we show a film clip, I would like to explain what you see, because there might not be time while the film clip is going on.

What you will see is a TV picture of a ship target, and in the center of the TV picture there will be a square box, a little box, and what this is, is a way of testing the radar seeker, and the TV is only a part of the test. What you are seeing is wherever that box is, that is where the radar seeker would be pointing. So that this means, by taking the TV and looking at the radar-seeker presentation, we can find out whether the radar seeker is looking at the center of the ship or whether it is looking at the end of the ship, or whether it is looking at the wake, and it is a way of using the TV with the radar seeker to understand what the seeker is doing.

Now, we will show the film to see this.

Now, that is the seeker TV camera that goes with the radar mounted in the chin of the airplane, and this is just a way of finding out about the seeker, and it is not the way it will be in the final assembly.

Here, you see it taking off.

Here is the TV presentation; you can see the little box in the center as they take off. There is the presentation and the pilot.

Here it is in flying against the ship, in against the ship, and, as you can see, the box which represents what the radar is doing, telling us what the radar is doing, [deleted]. It is a fairly small patrol ship. As you can see, [deleted].

We have literally hundreds of such flights and presentations in order to test the radar seeker. What it tells us is that with the radar seeker, we have chosen for the missile, with that, one of the technical worries in this seeker appears to be unfounded; namely, that the seeker, [deleted]. It is quite clear from all aspects and directions that [deleted] so it is an important milestone in understanding it.

Aircraft Launched Missiles

Senator Young. Mr. Chairman, have you any idea how many different kinds of missiles we have, in the three services, that are fired from airplanes?

Dr. Frosch. I am not sure I can catalog them out of my head, but I think I can tell you the Navy ones.

Senator Young. About how many are there?

Dr. Frosch. Well, there are really three, or there are really two Navy air-to-air missiles in the fleet, and there are two modifications of those two that are being developed as improvements. And there is one separate missile that is the Agile, which I just discussed, being developed. I dropped one. There is the Phoenix. So there are three air to air.

There is the Sidewinder, infrared relatively short-range air-to-air missile, which seeks the heat from the tailpipe, and there we have gone through various modifications, and we now have in the fleet the Sidewinder AIM9H, and we are working on an improved version to be called the AIM9L, which will come into the fleet, I guess, in 2 years.

We then have the Sparrow AIM7–E/E2 in the fleet, and it is a semiactive missile. That is, it homes on the reflection of the radar beam which is sent out from the aircraft.

We are working on the development of the AIM7–F, which is an improved modernized digital version of the AIM7–E. We have the Phoenix, AIM54, which I just discussed, a long-range air-to-air missile, 50-mile kind of range, which has a capability that several of them can be fired at several targets in quick succession; in fact, in flight in the air at the same time.

Finally, we have the Agile, a short-range air-to-air missile, which will replace the Sidewinder when it comes into the fleet.

We will end up, or the idea is to have three missiles, and one is what I might call a heavy long-range air-to-air missile for very high threat environment, the Phoenix, 50-mile range, and one aircraft can engage six targets with six missiles. Then we will have in the short range, in the short term, an IR-guided missile, which is a Sidewinder modification, eventually to be replaced by Agile, and separately we have an

intermediate range semiactive radar missile, the Sparrow, so there is a mix of ranges and capabilities and the three different kinds of seekers. It would be unwise, in my view at any rate, to try to intend or work on one kind of missile with one kind of seeker, because you are then vulnerable to one kind of countermeasure. You really need more than one and a mix of more than one kind of seeker and the different range properties, of which we have three.

I am talking only about air missiles.

Senator YOUNG. You are describing only Navy missiles, not Air Force missiles?

Dr. FROSCH. Yes, only about the Navy. I believe, in addition to the missiles I have described, the Air Force has a missile called Falcon which comes in two versions, one of which is infrared and one of which is semiactive. I believe they are both relatively short range, kind of like the Sidewinder short of range. So that makes a total of five, of which one is intended to be replaced by others.

MISSILE NAMES AND CHARACTERISTICS

Senator YOUNG. Wouldn't it be simpler if you could use one name and different numbers? You would think we could do something like the Russians. They have a dozen different versions of the MIG, and they just give each a new number.

Dr. FROSCH. We do that, too, and that is why we have Sidewinder 9–D, 9–H, and 9–L, but the difference between the Sidewinder and Sparrow is sufficiently great we would be obfuscating if we gave them the same numbers and names. It should be noted that both Air Force and the Navy use the Sidewinder and Sparrow, and both intend to use the Agile, and only the Navy will use the Phoenix, and only the Air Force will use Falcon, so out of the five missiles, three will be used by both services.

Senator YOUNG. The varying characteristics of all the missiles is difficult to remember.

Dr. FROSCH. It is a complicated problem because they have the subtle technical differences.

Senator YOUNG. I don't mean to demean the development of these missiles. We should, I think, have the best of everything, but remembering their characteristics does get to be a bit complicated.

Chairman ELLENDER. Proceed.

CONDOR MISSLE DEVELOPMENT

Dr. FROSCH. The Condor development effort has made considerable progress during the past year with the contractor demonstration flights successfully completed in August. Test objectives were fully demonstrated including [deleted] data-link, automatic midcourse guidance, command guidance [deleted]. Eight attempts were successful. This [deleted] pound high explosive warhead system has now demonstrated hits against simulated Soviet SAM sites, ships, and a revetted radar installation. We plan next to conduct technical and quasi Opeval using Navy personnel. The cost-constrained version of the full capability will give us a further parameter to evaluate in terms of military capability.

TARGET RECOGNITION ATTACK MULTISENSOR (TRAM)

The TRAM, target recognition attack multisensor, program of integrated infrared and laser sensors is planned for introduction into the A–6E and A–7E aircraft following extensive tests in the Mediterranean with 6th Fleet which used A–6 aircraft fitted with prototype equipment.

MISSILE DEVELOPMENT AND PRODUCTION COSTS

Chairman ELLENDER. Mr. Secretary, as you go along, you are mentioning different missiles that are now being studied and developed. I wish, as each one is described, you would include the cost of the development and what is estimated for the future.

Dr. FROSCH. Would you like it in the record?

Chairman ELLENDER. You can furnish it for the record; yes.

(The information follows:)

[Dollar amounts in millions]

Name	Designation	R. & D. cost (total estimate) millions
Condor	AGM–53	$184.2
Harpoon	AGM–84A	245.9
Harm	AGM–88A	35.0
Agile		216.3
Sidewinder	AIM–9L	[1] 6.9
Phoenix	AIM–54A	417.8
Sparrow	AIM–7F	71.3

[1] Plus $6,900,000 Air Force.

SURFACE WARFARE

Dr. FROSCH. Much of the future surface Navy will be the result of modern developments such as 170-ton hydrofoil ships based on proven designs and carrying surface-to-surface guided missiles such as Harpoon.

This is the surface-to-surface missile gunboat concept I mentioned earlier for the hydrofoil.

FISCAL YEAR 1973 PROCUREMENT AND TESTINGS

It is expected that procurement of these ships will begin in fiscal year 1973 using SCN funds. Sixty-ton hydrofoils have been tested in Southeast Asia; and one, the *Tucumcari* (PGH–2) made a 6-month European deployment to demonstrate to our NATO allies the naval capabilities of hydrofoils. We are looking to the day when we can build and operate hydrofoil ships in sizes up to several hundred tons.

We have a film clip of two of these hydrofoils.

"HIGH POINT"

The first is PGH–1, which is *High Point*, and she is in long swells, foilborne in open ocean from Seattle to San Diego, spring of 1971. As you can see, she occasionally comes to a swell that is high enough, so that the point of the bow just dips in but mostly she remains foilborne, such as there.

Now, a ship of this size could not operate at any speed like this in a sea of this kind.

Here she is doing, I don't know precisely, but something like 35 or 40 knots.

"FLAGSTAFF"

This is a clip of the *Flagstaff*, with a 6-inch gun turret taken from a tank, placed on the front of it, firing against shore targets on San Clemente Island and it was an experiment to demonstrate the fact that a small craft, which this is 120 tons, less than that, a 60-ton boat, could manipulate a 6-inch gun in a Sea State and do or be capable of doing good gun-laying against a shore target and this is a capability that we just don't have any other way to put in a ship as small as this, so we are beginning to see we can do interesting near-shore work with small hydrofoils. As I mentioned, out of these experiments have come the SCN program for the NATO hydrofoil.

INTERIM ANTISHIP MISSILE

Now, go to page 17—we have several interim antiship missile programs underway to provide fleet quickly with a better surface-to-surface missile capability. During fiscal year 1972, we will have equipped six DD's and two PG's with the semiactive Standard missiles and during this fiscal year we will equip additional combatants and provide a Standard ARM capability as well. We have a developmental effort underway to provide an active seeker head for Standard, and, if tests this fall confirm the performance, we may deploy some of these units until the Harpoon missile becomes available in the mid-1970's.

HIGH ENERGY LASER PROGRAM

The high energy laser program which I discussed last year is making progress [deleted]. The technical work is under the guidance of the Naval Ordnance and Naval Research Laboratories for the Naval Ordnance Systems Command.

AEGIS PROGRAM

The AEGIS program has made good progress and our technical effort appears ready to justify the belief that a system of greatly reduced cost and size is realizable. New technical possibilities [deleted] indicate that it may be desirable to designate the "Baseline" AEGIS system as one that would fit a ship the size of the [deleted] and other hulls.

VULCAN/PHALANX WEAPON SYSTEM

The Vulcan/Phalanx close-in weapon system has continued to achieve impressive results in developmental tests. The new penetrator projectile, being developed as part of the system, has demonstrated [deleted]. The overall program is proceeding against a set of objective achievement milestones. We expect to show that we can accelerate the schedule through extensive development and operational testing that will prove the success of the development earlier than originally planned.

SHORTSTOP MODULAR EW SYSTEM

The Shortstop modular EW systems, intended for reasons of weight and cost installation only aboard some aircraft carriers and other high value ships, has the capability to monitor the electromagnetic environ-

ment and thus recognize and display in tactical sequence the events of a surface ship engagement.

Completion of technical and operational evaluation of the Shortstop installed aboard U.S.S. *Biddle* is scheduled for March. On the basis of the tests completed to date, we have full reason to expect that the concept will be validated.

Low Cost EW Suite

For small ships where cost, size, and weight constraints are even tighter, we propose a "low cost EW suite" new initiative for fiscal year 1973. This project will be carefully defined to be a fiscally constrained development with a fully installed production cost goal. Cost targets of $0.5 million, $1 million, $2 million, and $3 million will be examined in terms of the tactical options afforded.

Prevention and Control of Environmental Pollution

Before I leave the surface warfare area, I would like to address our activities in the prevention and control of environmental pollution. We are working on technological means that ultimately could allow us to eliminate the overboard discharge of all types of ship waste including sewage, garbage, trash, et cetera. Contracts have been let to solve the most vexing of the waste problems, that of shipboard sewage treatment. There are three 500-man treatment units installed in a ship undergoing evaluation. We are investigating integrated waste management systems as a long-term solution to the waste problem. Currently under development are oil-water separators for shipboard use, and techniques to thicken oil films to facilitate oil removal will be investigated.

Encirclement and Compression of Oil Film

Here I have a film clip of technical interest. It shows effect of chemicals on an oil film, a laboratory one, and he is creating an oil film by pouring oil on the surface of this little basin. He will put in a couple of drops of a chemical which is, incidentally, nontoxic, and you can see what it does is push the oil film together so we can use it to encircle an oil film and compress it until it was convenient to move and in the laboratory it simply is picked up with the polyethylene sponge where at sea you have to pump it up or use some absorbent means but it means simplifying greatly the problem of picking up oil spills and this has been of interest to some of the Navy surface chemistry people because of Navy problems with spillages and the Navy responsibility for spills because it is obviously of general use in the whole technological problem of oil problems.

Chairman Ellender. You haven't tried it in the open sea?

Dr. Frosch. There have been experiments, I think one in the Chesapeake, on a natural slick, where it worked and there was one I remember at, of all places, the Detroit River where there was a problem with a spill and they were willing to try anything, and they tried this and it was of considerable help.

Chairman Ellender. It is not toxic?

Reuse of Ammunition Manufacture/Rework Explosives

Dr. Frosch. No; it is not. In fact, it is a surface active substance which is rather nontoxic.

ANTISUBMARINE WARFARE

The ASW R. & D. effort in large part is devoted to development of sensors, fixed and mobile surveillance systems, aircraft dropped and monitored systems, and submarine and surface ship sonars/towed arrays.

SURVEILLANCE PROGRAMS

The surveillance programs account for half of the fiscal year 1973 funds allocated to ASW sensors. In SOSUS there will be a continuation of improvements to our installed systems; [deleted]. The main effort in fiscal year 1973 in the mobile ASW surveillance program will be directed toward the continued development of the [deleted].

DIRECTIONAL COMMAND ACTIVATED SONOBUOY SYSTEM

Design approval testing of the directional command activated sonobuoy system (Dicass) will be completed in fiscal year 1973 and increased effort will be expended for improved acoustic search sensors which provide high data rate, wider band, and increased channel capacity for acoustic information from multisensor arrays and fields.

During 1971 we deployed three destroyers equipped with [deleted].

I would like to interpolate here because I mentioned several times testing of things by putting them in the fleet. This is a purposeful test to carry "fly before you buy" even one step further so we do more than developmental testing with some of these things before we decide what to do in the way of final development and production.

We are actually taking them to the fleet and working with the fleet directly in order to find out how useful they are.

COOPERATIVE PROGRAM WITH FRANCE

Chairman ELLENDER. Well, I notice on page 21 you have some cooperative work with the French. What is that?

Dr. FROSCH. We have known for a long time, as others, that [deleted] point of view; however, it is no easy task for a surface ship to tow a sonar around, say, [deleted] feet. We worked on this sonar, but have had no independent program.

Quite independently of us, but knowing of our general work in the area, the French began a project [deleted] in order to exploit this capability. We learned of this program and in some conversations and visits there and visits that they made here, it became clear there would be some sense in cooperating on this, both of us, they [deleted] we being able to contribute [deleted].

FUNDING ALLOCATIONS: PROMULGATION OF MEMORANDUM OF AGREEMENT

Both countries will share in the funding of the development of the sonar.

Chairman ELLENDER. In what proportion?

Dr. FROSCH. I think we are putting, or we will be putting in about [deleted].

I visited the laboratory in the area where they are doing it and engaged in some discussions with them. We are about to sign a memorandum of understanding between the two navies that will confirm this project. This is a case where we are getting something out of the cooperation, and so are they and we are very happy to do it.

Captor: Prime Contractor Proposal Evaluation

Now, go to page 22. Proposals in response to our competitive request for proposal for a Captor prime contractor are being evaluated. The contractor will work under the direction of the Naval Ordnance Laboratory, White Oak, Md. [Deleted.]

S–3A Aircraft

Of our two major ASW vehicle programs, the carrier-based ASW aircraft, the S–3A, the first flight of which was on January 21 of this year, is nearing completion of development. Fiscal year 1973 will see the first full system flight (including avionics). We will also have completed an evaluation of flying qualities and performances of the S–3A and assessment of flying test bed avionics in preparation for our exercise of the lot IV production option prior to February 1, 1973.

Sled Test of Ejection Seats

Now, we have a film clip of the first sled test of the ejection seats for the S–3A. This is an aircraft ejecting four people nearly simultaneously, so we have a special problem and we use a sled test at one of the laboratories, the Government facilities we discussed earlier.

Here are the first two, and well, here are the second two ejections, these are dummies, of course, instrumented dummies, so we can find out if we can successfully eject. That was a run with the sled going 450 knots. The whole parachute deployment is shown and the final recovery. This is shown greatly slowed down. It actually happens much more rapidly.

Here is the zero-zero test, that is, just sitting there, and the problem is to eject four people not hitting each other, high enough in the air to deploy the parachute so they can come down safely.

All of the parameters were well within safety limits.

Of course, ejection is safe and demonstrated to be safe. It is not without risk or stress, but, of course, it is a way to save life in emergency situations, so you have to take some risks in this.

Chairman Ellender. This will be used on which aircraft?

Dr. Frosch. On the S–3A aircraft, specifically.

Aircraft Flight

Here is some film of the first flight of the S–3A on January 21, 1972, at Palmdale. It lasted an hour and a half, reaching speeds up to 200 knots. We will see the takeoff and some clips of it flying and note that this aircraft has engines that are clean. There is no smoke from them during takeoff or afterward.

Avionics Test Bed

We are also working with a laboratary avionics test bed and flying a test bed of avionics in the P–3, so all of that testing of the various parts of the system is going on together and they will be put together shortly and tested.

Here, again, there is the boom that sticks out from the front of the aircraft and is not part of the aircraft but part of the test equipment for making measurements otherwise.

Destroyer/Helo System (LAMPS)

In the destroyer/helo system (LAMPS), development of the MK–3 integrated helo and ship baseline suites will continue and a Techeval for the system will commence. Included in the helo suite will be a radar, data link, electronic threat receiver, magnetic anomaly detector, display computer and associated helicopter securing device, tactical displays for ship and helo data and a data link. Extensive ground and flight evaluation will be performed on all equipment prior to incorporating it into a total system for Techeval. Techeval will be conducted with a shipboard mockup and a test-bed helicopter to evaluate the performance of the shipboard and helicopter avionics operating as an integrated system. At sea tests will evaluate a helicopter securing device needed for operations in rough weather.

At-Sea Operational Programs MK–I and MK–II LAMPS

We have an extensive at-sea operational program underway employing essentially "off-the-shelf" equipment. These modifications of the existing Kaman SH–2D helicopters are designated the MK–I and MK–II LAMPS. The MK–I LAMPS is operable from DE, DEG, DD, and DLGN type ships. It is equipped with the LN–66 radar, magnetic anomaly detector (AD) data link, passive ECM, and an active and passive buoy capability. The MK–II LAMPS uses an APS–115 radar instead of the LN–66. Extensive tests board the U.S.S. *Fox* of the MK–II have confirmed that an improved [deleted] is required for the MK–II.

Now, I have a film clip of the LAMPS operating from the *Fox* at sea. That is the van that contains the shipboard equipment we were experimenting with being put aboard the ship. As you can see, there is a helo platform on the ship's upper level where you see the tail of the helo. That is the helo itself. The radar is mostly responsible for what I can describe as a droop snoot on the helo. In the later version, the radar will be integrated. This is a deployment of sonobuoys from the helo. We had never used sonobuoys from the helicopter and we wanted to test whether they would deploy satisfactorily. These are deployed much more rapidly in this test than they would actually deploy in use at sea.

It was simply test of ejection of the sonobuoys.

Here is a landing of the helicopter at sea.

This is in large measure an attempt to do more with a helo, using a helo that we already own, by putting enough equipment in it and using it in a new way.

Program Development Cost Expenditures and 1973 Funding

Senator Young. Before you leave that, what is the estimated cost of the program?

Dr. Frosch. The development cost?

Senator Young. Yes.

Dr. Frosch. The total estimated cost to complete, which will be another year or two, is $72.5 million and through fiscal 1972 we have spent $32 million. In fiscal year 1973 the request is for slightly less than $21 million.

Now, going to page 24, to undersea warfare:

Undersea Warfare

Undersea warfare research and development in fiscal year 1973 has two main thrusts—development of non-ASW weapons (mines and submerged launched weapons) and the development of reconnaissance/intelligence equipments for use by submarines.

Encapsulated Harpoon

Probably the most exciting new weapons development effort in this area is the encapsulated version of Harpoon. We are doing this in parallel with the regular Harpoon effort as an example of an efficient way to reduce overall life cycle costs of a system. This weapon [deleted] will give our SSN's of the Permit/Sturgeon and SSN 688 class a significant capability [deleted] against the growing Soviet surface fleet. Initially, this weapon will have a range in excess of [deleted] miles.

Advanced Airborne Mine C/M Equipment

In the mine warfare area, development will continue on the advanced airborne mine C/M equipment program to provide helicopters with increased magnetic sweep capabilities and various other mine countermeasures systems for helicopters and small craft against all types of mines.

Quickstrike Mine

Development continues on the Quickstrike mine, [deleted].

Advanced Submarine Surveillance Equipment Program

Under the advanced submarine surveillance equipment program (SSEP) development [deleted] will be continued. Also continued will be investigation of [deleted] capabilities. In engineering development in the TUBA II [deleted].

We have completed initial Albacore tests [deleted]. The tests were successful [deleted] and we are getting ready for our next steps.

Space Program

As part of the Navy space program, we plan to provide more rapid ways of gathering information over broad areas of the earth by satellite. In this regard, a portion of the Navy's R. & D. space surveillance dollars is being redirected toward evaluations of combinations of sensors and systems by which commanders at sea can be adequately provided surveillance information. [Deleted] aircraft will serve as test platforms as a part of this effort. The test part of this program will be implemented through an expansion of the traditional mission of COMOPTEVFOR (Commander, Operational Test and Evaluation Forces). First experiments with this concept have been carried out by the commander of the 1st Fleet.

Fleet Satellite Communications System

Implementation of the fleet satellite communications system entails the development, procurement and launch of synchronous channelized UHF satellites, outfitting all ships with fleet broadcast receivers, and

procurement of UHF transceivers for shore stations, selected surface ships and nuclear submarines. Existing equipment is being modified for installation in the P–3C, S–3A and Tacamo programs. The Navy continues work on an advanced super high frequency (SHF) shipboard terminal for use in the defense satellite communications system (DSCS).

Transit Satellites

The Navy is continuing its efforts on future Transit satellites to improve the precision navigation fixes for our SSBN's. Transit is currently operational with five satellites in orbit and is maintained in an operational status for our submarine force and selected surface ship users until such time as an advanced navigation satellite system may be developed within the Department of Defense.

Timation Satellite

The problem of how best to provide precise position fixing information continuously on a worldwide basis and simultaneously derive altitude information for aircraft users is being investigated in a series of satellite experiments. This technology effort with time navigation (hence the name Timation has progressed well thus far. The Naval Research Laboratory experimental satellites—Timation I and II—have demonstrated the feasibility of the principle involved and given experimental indication of the ultimate accuracies that are potentially obtainable. To continue this experimentation, the Naval Research Laboratory will fabricate a research satellite, Timation III, to be placed in [deleted] during [deleted].

ULMS

In order to insure the continuing survivability of the Navy's submarine based missile force against a broad spectrum of potential future threats, the undersea long range missile system (ULMS) was conceived. The fiscal year 1973 program continues and expands the effort started in fiscal year 1972 and is aimed at the achievement of a calendar year 1977 delivery of an advanced technology missile and the development of long leadtime submarine and propulsion equipment components. The ULMS IOC is now planned for calendar year 1978. This new force is intended to supplement the existing Polaris and Poseidon force as necessary and act as an eventual replacement for the current SSBN's sometime in the future. At one point, the concept of extending the range of the Poseidon missile was investigated. This concept was referred to as Expo. The current program is a time-phased development which will give us a retrofit capability with the ULMS–1 missile into the Poseidon submarines, if needed, while on a longer time schedule developing the advanced technology for an even longer range and more capable missile, the ULMS–2. The ULMS–2 missile will be designed to larger dimensions in order to take advantage of the larger launch tubes of the ULMS submarine.

FUNDING

Chairman ELLENDER. I asked other witnesses to furnish in detail the funds being asked for ULMS. You will do that?

Dr. FROSCH. We can furnish it.

(The information follows:)

The fiscal year 1973 R.D.T. & E. request is for $520.4 million. This includes [deleted] million for ULMS I missile development, component testing of [deleted] and submarine weapon support subsystem development. The remaining [deleted] million will be used for continuation of submarine and propulsion plant design and development and command and control development.

Fiscal year 1973 (in millions)

R.D.T. & E., N:	
ULMS I (C–4)	[Deleted]
[Deleted]	
Weapon support subsystems	[Deleted]
Submarine design	[Deleted]
Command and control	[Deleted]

PROGRAM SCHEDULE

Senator YOUNG. When would you plan to call for the first ULMS submarines to be operational?

Dr. FROSCH. I think 1978 calendar year.

Senator YOUNG. When would you finish research and development?

Dr. FROSCH. We would have to start constructing the submarine in 1974, I think it would be there is some long lead item asked for in 1973 in the SCN appropriation.

Senator YOUNG. The first one would be operational when?

Dr. FROSCH. Late 1978.

FBM SYSTEM IMPROVEMENT

Now to page 28. The program for improvement of FBM system command and control communications envisions a low probability of intercept ship-to-shore communications system through the use of a survivable communication satellite link between the SSBN and the National Command Authority. In this regard, funds are programed in fiscal year 1973 [deleted].

SANGUINE SURVIVAL COMMUNICATIONS SYSTEM

Continuing studies in the Sanguine survivable communications system featuring low data rate ELF transmission to submerged deployed forces are programed in fiscal year 1973.

Senator YOUNG. How are you progressing with the Sanguine program?

Dr. FROSCH. The experiments continue to be successful [deleted] Sea and other places and we are continuing evaluation and that continues to show there are no environmental effects as far as we can find that are significant and certainly none that are different than those due to ambient electromagnetic fields from power systems and the kind we live in in this room. We are also doing work on making sure the effects of the antenna on telephone systems and powerlines defense can be taken care of.

Senator YOUNG. You started to deploy the system in Wisconsin?

Dr. FROSCH. We have built an experimental section of the system and not yet asked the permission to deploy a full system.

Senator YOUNG. Would your latest program call for a much smaller area than originally contemplated?

Dr. FROSCH. That is correct. We made some discoveries in development work [deleted] and they have enabled us to cut down the requirements for size and power considerably.

Senator YOUNG. Do you have permission to deploy?

Dr. FROSCH. We have no permission to deploy nor have we asked for it, but are considering when it would be appropriate to ask for funds to build the system. We would like to complete a little more of the validation and environmental work before we are ready to do that.

SYSTEM EXPENDITURES

Senator YOUNG. How much have you spent on the system so far?

Dr. FROSCH. We spent through fiscal 1972, $48.8 million and it includes earlier experiments in North Carolina and the construction and experimental work in Wisconsin.

OMEGA STATION CONSTRUCTIONS AND NEGOTIATIONS

Senator YOUNG. How are you progressing with the Omega systems? Are you having problems in some parts of the world?

Dr. FROSCH. I believe that the stations all over the world have been negotiated. Some of them are being built. In one or two cases, there are some delays having to do with the foreign nation provision of their part of the construction. At the present time, two out of the eight intended stations are under construction. So that is going along very well. There is one where there are still negotiations about exactly which of the two countries involved, United States or foreign country, will pay and why.

Senator YOUNG. Which stations are you having trouble with?

Dr. FROSCH. We are still in negotiation with the French with regard to the type of antenna (valley span or tower) and in negotiation with the Australians. I don't know that either one could be described as having trouble, but they are in negotiation.

OPERATIONAL DATE

Senator YOUNG. When will the whole system be operational?

Dr. FROSCH. I will have that answer in a moment.

Senator YOUNG. Suppose you had only three or four stations. Could you use them?

Dr. FROSCH. As soon as we have as many as three or four online, we will begin to have a system. With five online, we will have most of the world covered.

Without Australian and the French island, La Réunion, we will not be covered in the southern Pacific and Indian Ocean. We expect to have the whole system completed, I am told, by June 1975.

Senator YOUNG. Thank you.

MARINE CORPS PROGRAMS

Dr. FROSCH. Now, going to page 30:

Marine Corps R. & D. programs are primarily carried out in conjunction with the other services. For example, the Marine Corps and

the Army are involved in several joint efforts in the weaponry area; encapsulated flame rounds to provide all tanks with a flame capability; advanced Redeye, a lightweight air defense weapon to provide a man-transportable surface-to-air missile system; and a tactical motor transport vehicles project. In addition, the Army and the Marine Corps are working together on the critical problems of hostile weapons location. The Air Force and the Marine Corps are nearing completion of development of a tactical intelligence system. The Marine version is called MAGIS (Marine Air/Ground Intelligence System).

PROGRAM FUNDING REQUEST

Chairman ELLENDER. Will you supply for the record the total amount that is requested specifically for the Marine Corps?

Dr. FROSCH. In R.D.T. & E.?

Chairman ELLENDER. Yes. Also the funds for this project you contemplate for the Marine Corps.

Dr. FROSCH. Yes.

(The information follows:)

Marine Corps R.D.T. & E., fiscal year 1973

[Dollars in thousands]

PE, Project number and title	*Amount*
Budget activity 1—Military sciences:	
65151M—Studies and analysis support (Marine Corps):	
CP–018–90—Studies and analysis support, (Marine Corps	$2, 350
65153M—Center for Naval Analyses (Marine Corps):	
CF–099–90—Center for Naval Analyses (Marine Corps)	950
Total budget activity 1	3, 300
Budget activity 5—Ships, small craft, and related activity:	
31011N—Cryptologic activities:	
C3303—Marine Corps signal intelligence development (total)	[deleted]
Budget activity 6—Ordnance, combat vehicles and related equipment:	
26620M—Marine Corps weaponry (operational systems):	
C4703—Landing force assault amphibian vehicle (total)	400
63660M—Marine Corps weaponry (advanced):	
C1202—[Deleted] ordnance	500
C4101—Tactical motor transport vehicles	150
C4701—Ammunition for XM202 multishot portable flame weapon system launcher	400
C4702—Encapsulated flame round program	200
Subtotal advanced development	1, 250
64660M—Marine Corps weaponry (engineering):	
C1701—Lighweight air defense system	1, 000
C1703—Mobile surface-air missile system	400
C4103—Tactical motor transport vehicles	150
Subtotal engineering development	1, 550
Total budget activity 6	3, 200

Marine Corps R.D.T. & E., fiscal year 1973—Continued

[Dollars in thousands]

PE, Project number and title	*Amount*
Budget activity 7—Other equipment:	
26621M—Other Marine Corps development (operational systems):	
C3118—Marine Corps operational electronics development	$700
C4104—Marine Corps operational logistics development	235
26622M—Marine Corps data systems (operational systems):	
C3116—Tactical air control systems/tactical air defense systems joint interface program	500
C3120—Marine Air Command and control system operational development	2, 235
28010M—TRITAC:	
C3108—Tactical message distribution and voice communications equipment	200
C3109—Tactical satellite communications equipment	450
C3114—Landing force integrated communications system implementation	150
C3115—Electromagnetic compatibility center support for the Marine Corps	120
C3119—Tactical electronic switching facilities	200
C3125—Transmission subsystem improvement	200
C3126—TRITAC implementation	1, 600
C4102—Power source systems	200
Subtotal operational systems development	6, 790
63765M—Other Marine Corps development (advanced):	
C1203—High energy laser	300
C3102—Tactical exercise simulator and evaluator	500
C3301—Transportable communications countermeasures system	400
C3302—Ground radar countermeasures	100
C3602—Remote detection and surveillance devices	250
C3604—Amphibious reconnaissance support system	50
C3606—Combat surveillance target acquisition system	100
63766M—Marine Corps data systems (advanced):	
C3101—Marine Tactical Command, control system	1, 200
C3103—Marine integrated fire and air support system	1, 300
C3104—Tactical combat operations system	1, 500
Subtotal advanced development	5, 700
64765M—Other Marine Corps development (engineering):	
C3110—Lightweight three-dimensional ground controlled intercept radar	4, 000
C3111—Position location reporting system	2, 450
C3112—Tactical warfare analysis and evaluation system	1, 000
C3607—Hostile weapons locator	630
64766M—Marine Corps data systems (engineering):	
C3608—Marine air ground intelligency system	500
Subtotal engineering development	8, 580
Total budget activity 7	21, 070
Budget activity 8—Programwide management and support:	
65854M—Special Laboratory Support:	
CF–099–91—Special laboratory support (total)	4, 310
Total Marine Corps R.D.T. & E	32, 630

MANAGEMENT

Dr. FROSCH. Now, on page 32, "Management."

Recent years have seen several problems arise which have challenged our capability to find better ways of dealing with them. I can

give you some feeling for how we cope with these problems by explaining what we are doing.

Incremental Funding

Incremental funding, that is, asking for money to support only a year's effort, has been a feature of the R.D.T. & E. budget requests for several years. Last year, two congressional committees provided in their reports some new guidance as to how incremental funding is to be implemented in the future. In responding to the guidance, we have found the most difficult job is to translate the new requirements into clear and practical instructions to the people on the project level who must do the detailed planning. For that reason, I recently called all of our major project managers together and met with them for the purpose of explaining the new guidance. We also formed a team of knowledgeable people including two flag officers and conducted a line-by-line review of the budget submissions for our larger projects. Based on that review, we have made reductions where we could determine that funding had been requested to do work which should be funded in fiscal year 1974. These management actions have brought the Navy into compliance with the guidance to the maximum extent feasible in the short time between receiving definitive guidance and the completion of the fiscal year 1973 budget. We will continue to emphasize this in the future.

Early and Sound Judgments Respecting Performance Required by National Policy

I now go to page 37.

Mr. Chairman, my presentation today has been intended to highlight the thrust of the research, development, test, and evaluation, Navy and USMC program for fiscal year 1973, and to show how the program will produce the weapons and equipment needed for the future Navy. In addition, I have described how we have approached solutions to some of our more immediate, as well as our continuing, problems. Principal among these is the need to make the most careful decisions early about the exact extent to which we must extend our performance to fulfill the requirements of national policy. We are trying to develop systems better tuned to the local procurement equation, an equation in which resource limits play a large role. We are evaluating management disciplines to get the most of every dollar and every man in the R. & D. community. I believe you will observe some results of our efforts in this line in the Navy fiscal year 1973 program.

Given your approval, we will proceed with the conduct of this R. & D. program as another step in the direction of providing our naval forces with the capability to stand up to the challenges of today and tomorrow in the arena of the world's oceans.

Mr. Chairman, I request the support of the committee, and I am prepared to answer any questions as you may desire.

(The appendixes follow:)

APPENDIX A

Fiscal Year 1972/Fiscal Year 1973 R.D.T. & E. N. Fiscal Summary

The Navy Program request for RDT&E in FY 1973 consists of New Obligational Authority in the amount of $2,730.0M. Shown below is this program along with that of FY 1972 divided among the eight budget activities.

FISCAL YEAR 1972-73 R.D.T. & E., N PROGRAM BY BUDGET ACTIVITIES

[In millions of dollars]

	Fiscal year—	
	1972	1973
1. Military sciences	143.5	151.2
2. Aircraft and related equipment	613.4	380.9
3. Missiles and related equipment	564.8	962.3
4. Military astronautics	53.1	89.8
5. Ships, small craft and related equipment	411.2	430.2
6. Ordnance, combat vehicles and related equipment	59.9	44.8
7. Other equipment	446.8	511.7
8. Program-wide management and support	152.9	159.1
Total	2,445.6	2,730.0

The FY 1973 proposal constitutes an increase of about 11.2% or $284.4M over FY 1972. Explanation of the changes in the various budget activities is contained in appendix B along with a summary of significant programs.

Shown here is our program allocated by the categories we use in the Department of Defense.

R.D.T. & E., NAVY BY DOD CATEGORIES

[In millions of dollars]

	Fiscal year—	
	1972	1973
1. Research	124.9	128.6
2. Exploratory development	280.2	300.0
3. Advanced development	502.8	590.9
4. Engineering development	543.7	805.9
5. Management and support	238.3	250.4
6. Operational systems development	755.7	654.2
Total	2,445.6	2,730.0

APPENDIX B.

Budget Activity Summary

In the following pages are listed for each budget activity the significant programs and the dollar amounts in millions associated with each in FY 1972 and FY 1973. Included also is a brief explanation for the increases and decreases for each budget activity along with additional details for each.

BUDGET ACTIVITY 1—MILITARY SCIENCES

[In millions of dollars]

	Fiscal year—		
	1972	1973	Change
Total	143.5	151.2	+7.7
Research	124.9	128.6	+3.7
Management and support:			
Studies and Analysis Support (Marine Corps)	2.2	2.3	+.1
Studies and Analysis Support (Navy)	9.2	12.5	+3.3
Center for Naval Analysis/Marine Corps	.7	.9	+.2
Center for Naval Analysis/Navy	6.5	6.8	+.3

The small increase in Research does little more than meet increasing costs. About $1.2 million of the increase in this subactivity results from the reflection in FY 1973 of the full effect of the classified pay increase. This subactivity maintains the Navy in-house capability for advancing technologies of importance to the Navy's mission and conduct outside research in scientific disciplines related to Naval Operations.

BUDGET ACTIVITY 2—AIRCRAFT AND RELATED EQUIPMENT

[In millions of dollars]

	Fiscal year—		
	1972	1973	Change
Total	613.4	380.9	−232.5
Operational development:			
A–6 squadrons	3.3	4.4	+1.1
A–7 squadrons	2.7	3.6	+.9
F–14 squadrons	128.1	162.6	+34.5
E–2C squadrons	30.9	14.1	−16.8
S–3A aircraft	208.4	36.8	−171.6
LAMPS		20.7	+20.7
Aircraft systems (A/C Flight test)	4.6	5.1	+.5
Aircraft propulsion	4.6	4.2	−.4
Air EW	15.0	9.0	−6.0
Advanced development:			
Aircraft propulsion	7.1	10.2	+3.1
Avionics	5.9	3.6	−2.3
Air ASW	[Deleted.]		
Air EW			
V/STOL for sea control ship (proto)	8.0	24.0	+16.0
Engineering development:			
Aircraft systems	0	14.0	+14.0
Aircraft propulsion	100.2		−100.2
Air ASW	9.2	12.9	+3.7
Air EW	7.6	8.9	+1.3
Target development	8.2	9.4	+1.2
All other programs	6.4	4.6	−1.8

The net decrease in FY 1973 of $232.5M results for the most part from the decrease of $172M as the S3A aircraft passes the peak development year. The Advanced Technology Engine transfers out of Aircraft Propulsion (Eng) to the F–14 line causing an increase in the F–14 line although there is a decrease of $65M in the amount allocated for the F14A as that aircraft progresses in development. Similarly, the LAMPS shown under Air ASW (Advanced) in FY 1972 is established as a separate element under Operational Development in FY 1973 with a net increase of [deleted] million reflected. Other decreases are shown in the nearly complete E2C aircraft and certain EW projects under Advanced Development. There are some compensating increases such as the increase in A/C systems (Eng) with the establishment of the Improved CH53 Helicopter program and a $16M increase for full scale prototype development for V/STOL aircraft.

BUDGET ACTIVITY NO. 3—MISSILES AND RELATED EQUIPMENT

[In millions of dollars]

	Fiscal year—		
	1972	1973	Change
Total	564.8	962.3	+397.5
Operational development:			
FBM systems	33.2	22.2	−11.0
SSBN defense	12.2	[Deleted]	
FBM command and control	13.7		
Air to air weaponry	25.0	21.5	−3.5
Air to surface weaponry	23.6	8.9	−14.7
Advanced development:			
Surface launched weaponry	4.2	7.0	+2.8
Air to ground weapon technology	6.3	7.3	+1.0
AGILE	22.1	26.1	+4.0
Defense suppression weapons technology	5.8	7.3	+1.5
Cruise missiles	14.0	16.0	+2.0
Weaponizing (proto)	.5	6.0	+5.5
Harpoon	38.5	58.3	+19.8
Engineering development:			
Surface launched weaponry	53.5	62.4	+8.9
AEGIS	99.2	82.3	−16.9
ULMS	139.8	520.4	+380.6
Management and support:			
Pacific missile range	65.2	66.8	+1.6
All other programs	8.0	4.1	−3.9

The large increase in funding betwen FY 1972 and FY 1973 results almost entirely from the greatly increased effort in the ULMS program as work is accelerated for this weapons system. Also in the strategic area, there are smaller increases in [deleted] and a partially compensating decrease in FBM systems. Significant decreases are also reflected in the CONDOR (Air-to-Surface Weaponry) and AEGIS programs as these weapons progress in the development cycle. The only other significant increase is in HARPOON as this program gets into the stage where developmental hardware is being fabricated. Smaller increases are reflected in Surface-Launched Weaponry for the Standard Missile SSM and Point Defense Improvement and in the Advanced Prototyping program for Weaponizing.

BUDGET ACTIVITY 4—MILITARY ASTRONAUTICS AND RELATED EQUIPMENT

[In millions of dollars]

	Fiscal year—		
	1972	1973	Change
Total	53.1	89.8	36.7
Operational development:			
Satellite communications	[Deleted]		
Weather service			
Advanced development:			
Space technology	[Deleted]		
All other programs	.5	.4	.1

The increases in this program result from increased effort in the development of the satellite hardware phase of the [deleted] and a smaller increase in the [deleted] element the bulk of which is related to a classified project.

BUDGET ACTIVITY 5—SHIPS AND SMALL CRAFT

[In millions of dollars]

	Fiscal year 1972	Fiscal year 1973	Change
Total	411.2	430.2	+19.0
Operational development:			
Submarines (sonar)	0	28.1	+28.1
Surface ASW	4.1	2.1	−2.0
Submarines (silencing)	[Deleted]		
Cryptologic activities			
Special activities			
Advanced development:			
Communications	1.0	3.4	+2.4
Surface platforms	57.5	80.1	+22.6
Surface propulsion	5.5	14.0	+8.5
Surface ASW	9.9	21.8	+11.9
Surface E/W	[Deleted]	[Deleted]	[Deleted]
Other surface development	6.7	5.2	−1.5
Reactor propulsion plants	34.4	41.8	+7.4
Submarines	5.9	5.6	−.3
Sub surv eq program	[Deleted]		
Communications system			
Engineering development:			
Surface E/W	[Deleted]	[Deleted]	[Deleted]
Submarines	8.1	9.3	+1.2
Sub tax W/F systems	[Deleted]		
Sub surveillance eq prog			
All other programs	11.7	13.9	+2.2

The net increase of $19 million in this activity is the result of several factors. There is a transfer of the BQS–13 Sonar from the Submarine Tactical Warfare Support element under Engineering Development to the operational development element Submarine with a net increase of about $6 million. Other increases are shown under Surface Platforms ($23 million) as the Surface Effects Ships program accelerates and about $12 million Surface ASW primarily for the Towed Sonar effort. Another increase of about [deleted] million in surface EW (Engineering Development) is mostly due to the establishment of the Low Cost EW Suite. A significant decrease of about [deleted] million is shown in the classified special activities program. Several smaller changes also influence the net change in FY 1973.

BUDGET ACTIVITY 6—ORDNANCE COMBAT VEHICLES AND RELATED EQUIPMENT

[In millions of dollars]

	Fiscal year 1972	Fiscal year 1973	Change
Total	59.9	44.8	−15.1
Operational development:			
Captor		[Deleted]	[Deleted]
Submarine tactical warfare system	17.1	7.0	−10.1
Advanced development:			
Ordnance and fuzing	4.4	5.2	+.8
Mine development	24.1	3.1	−21.0
Engineering development: Ordnance and fuzing	7.6	3.8	−3.8
All other programs	6.7	6.3	−.4

This relatively small program decreases a net of about $15 million in FY 1973. The transfer of the Homing Mine CAPTOR from the Advanced Development element of Mine Development to Operational Development nets a decrease of $1.6 million. The only other significant change is a decrease of $10 million in Submarine Tactical Warfare Systems as the MK–48 torpedo nears operational status.

BUDGET AUTHORITY 7—OTHER EQUIPMENT

[In millions of dollars]

	Fiscal years		
	1972	1973	Change
Total	446.8	511.7	+64.9
Operational development:			
TRITAC-Marine Corps	1.3	3.1	+1.8
Underseas surveillance systems	24.7	[Deleted]	
Exploratory development:			
Target surveillance technology	36.3	38.1	+1.8
Command and control technology	17.9	20.1	+2.2
Weaponry technology	71.0	77.2	+6.2
Naval vehicle technology	39.2	41.1	+1.9
Support technology	80.8	87.0	+6.2
Laboratory independent exploration development	13.8	14.6	+.8
Nuclear propulsion	20.1	21.0	+.9
Advanced development:			
Electromagnetic/optical systems	16.5	15.9	−.6
Command support Undersea surveillance	[Deleted]		
Marine Corps data systems	3.0	4.0	+1.0
Human resources	4.0	4.3	+.3
Medical	3.2	4.3	+1.1
Oceanographic systems	8.8	7.4	−1.4
Ocean engineering technology	8.9	9.7	+.8
Environmental protection	1.9	4.3	+2.4
Special warfare	10.1	7.2	−2.9
Reliability and maintainability	5.8	5.0	−.8
ASW sensors prototyping	1.5	5.0	+3.5
Engineering development:			
Electromagnetic/optical systems	7.9	8.1	+.2
Tactical command/control	4.7	5.6	+.9
Other Marine Corps development	8.0	8.1	+.1
All other programs	24.0	20.4	+3.6

The increase of $64.4 million in FY 1973 over FY 1972 results from a few large increases and a number of small rises in part compensated by a very few small decreases. The Undersea Surveillance programs, both operational and advanced development, combine for an [deleted] million. [Deleted.] A much smaller but significant [deleted] million is reflected in the ASW Sensor Prototyping program as this effort becomes more fully established as an integrated part of our development programs.

Commencing in FY 1973 all Exploratory Development programs are carried under Budget Activity 7. In addition this large effort has been recast into the seven program elements shown above. This important phase—the prelude to advanced development—shows an increase of $20 million in the aggregate in FY 1973.

BUDGET ACTIVITY 8—PROGRAM WIDE MANAGEMENT AND SUPPORT

[In millions of dollars]

	Fiscal years		
	1972	1973	Change
Total	152.9	159.1	+6.2
Management and support:			
Facilities and installations support	122.0	112.6	−9.4
Atlantic underwater test and evaluation center	12.9	12.1	−.8
Management and technical support	11.1	10.3	−.8
Special laboratory support (Marine Corps)	2.9	4.3	+1.4
Navy artic research laboratory Point Barrow		4.5	+4.5
Tactical electromagnetic support	1.6	5.1	+3.5
ASMD test range		5.0	+5.0
USS Hip Pocket	.6	3.0	+2.4
All other programs	1.8	2.2	+.4

This activity increases slightly between FY 1972 and FY 1973. The decrease of $9.4 million in Facilities and Installation Support results principally from the transfer, to the appropriation Operations and Maintenance Navy of the support of the Naval Training Device Center, Orlando, Florida which was funded at $7.6

million in FY 1972. Increases are reflected resulting from the assumption of support ($4.5M) in FY 73 of the Navy Artic Research Laboratory Point Barrow, Alaska and the establishment of the Anti-Ship Missile Defense Test Range at $5.0 million. Other compensating changes result in the net increase of $6.2 million.

MILITARY SCIENCES

Chairman ELLENDER. $151,144,000 is requested for fiscal year 1973 for the budget activity entitled "Military Sciences." $143,505,000 was provided for fiscal year 1972. What is involved in this rather large increase?

Admiral HOLMQUIST. An increase of $7,639,000 is requested for fiscal year 1973. Of this amount, $3,724,000 is for the research program, principally in the fields of electronics and materials; $3,365,000 is for the Studies and Analysis Support programs (Navy and Marine Corps); and the remainder, $550,000, is for the Center for Naval Analyses (Navy and Marine Corps).

Chairman ELLENDER. Would you provide a tabulation for the record showing where these increases are by program element?

Admiral HOLMQUIST. I will be glad to do so.

(The information follows:)

TABULATION OF MILITARY SCIENCES INCREASES BY PROGRAM ELEMENT

[Dollars in thousands]

Program element	Fiscal year 1972 estimate	Fiscal year 1973 estimate	Increase, fiscal year 1973 over fiscal year 1972
61151N Research	124,865	128,589	+3,724
65151M Studies and analysis support (Marine Corps)	2,200	2,350	+150
65152N Studies and analysis support (Navy)	9,240	12,455	+3,215
65153M Center for naval analyses (Marine Corps)	700	950	+250
65154N Center for naval analyses (Navy)	6,500	6,800	+300
Total military sciences	143,505	151,144	+7,639

RESEARCH

Chairman ELLENDER. Of the total requested for military sciences, $128.6 million is for the program element entitled "Research." Pages 1 and 2 of the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

RESEARCH

Description.—This element encompasses research programs in the Physical, Engineering, Environmental, and Life Sciences, all of which are directly relevant to improvements in naval operational capabilities. This element is subdivided into the following subelements:

11. General physics
12. Nuclear physics
13. Chemistry
14. Mathematics
21. Electronics
22. Materials
23. Mechanics
24. Energy conversion
31. Oceanography
32. Terrestrial sciences
33. Atmospheric sciences
34. Astronomy and astrophysics
41. Biological and medical sciences
42. Behavioral and social sciences
00. In-House laboratory independent research

As illustrated below, research supported under this element has broad military significance.

(*a*) Laser-related research in optical components and materials to exploit fully their potential for a broad set of operational capabilities from range-finding and communication to weaponry.

(*b*) Superconductivity research for sensitive magnetic and infrared detectors, gravity meters, high power microwave generation, and shipboard motors and generators having greatly reduced size and weight.

(*c*) Research to provide essential information toward clarifying and predicting nuclear weapons effects on personnel, materials, and structures used in the Navy.

(*d*) Surface and colloid chemistry research related to problems of lubrication, adhesion, corrosion, and wave-damping.

(*e*) Scientific investigations in analytical chemistry for determining the structure of matter; and the identification and removal of toxic substances in submarine atmospheres.

(*f*) Research toward deriving advanced mathematical and computer tools for analysis of fluid flows in hydrodynamics and ship design, for electromechanics in the design of communications systems, and for analysis of ship structures in the development of new ship concepts.

(*g*) Electronics research encompassing high-resolution collection and interpretation of radar scattering from sea and man-made objects, such as surface ships.

(*h*) Research in materials for transparent armor, involving new approaches to strengthening massive glass for deep sea vessels and structures.

(*i*) Research concerning the strength, toughness, fracture and deformation resistance of metals and alloys toward obtaining lower weight, higher stresses, and greater reliability in terms of improved ship and aircraft performance, both in range and payload.

(*j*) Analytical and numerical determination of transonic and hypersonic flow fields, including shock-boundary layer interactions toward body optimization and stability and control characteristics for aircraft and missiles throughout the speed range.

(*k*) Research in the physical and chemical phenomena relating to the storage, release and utilization of energy contained in fuels, propellants explosives and active components of various armaments.

(*l*) Acoustics research, emphasizing oceanic effects on generation, transmission, reception and interpretation of underwater sounds as well as sea bottom characteristics affecting acoustics, magnetic and gravity fields.

(*m*) Study and prediction of coastal, deltaic and estuarine processes and environments as aids for amphibious and mine warfare operations and for shore facility construction activities.

(*n*) Research in lightning spectroscopy and photometry, to minimize hazards to aircraft, and to discriminate between man-made and natural events causing interference to communications systems.

(*o*) Investigations of the ultraviolet and infrared regions for improvement in missile and ship surveillance capabilities.

(*p*) Biological and Medical research to permit circumvention of biological degradation of structures, materials equipment and supplies and to enhance health maintenance and extension of work capabilities of naval personnel.

(*q*) Research toward new techniques for maximizing the visual, vocal and auditory capabilities of man in stressful situations.

The Navy sponsors a program of research in universities as a means of fulfilling its long-term needs for knowledge in science and engineering pertinent to the DOD mission. About five years ago, the Navy, in conjunction with the other services, intensified its efforts to achieve a wider geographic distribution of research funds. In some instances, forward funding has been provided to insure these institutions a reasonable lead time for primary instrumentation and for making commitments to scientists engaged in the program. These programs are under review and the funding profile will be adjusted to confirm to the incremental funding policy as quickly as feasible.

Research

Chairman Ellender. I note that, since fiscal year 1971, your request for research has risen by almost $14 million. I also note that, for the

same period, the number of man-years required to accomplish the work of this program has risen from 2,342 to 2,472, or an increase of 130 man-years. Is most of the $14 million increase attributable to this increase in personnel and the compensation and benefits of these personnel?

Admiral HOLMQUIST. Approximately $5 million of the total increase of $14 million, from fiscal year 1971 to fiscal year 1973, is required to support the estimated increase of 130 man-years at Navy laboratories during the same period. The remainder of the increase provides for research to be performed by university and industrial contractors.

IN-HOUSE LABORATORY INDEPENDENT RESEARCH

Chairman ELLENDER. Of the total requested for research, I note that $14.5 million is for "In-house independent laboratory research." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Research

Title: Research

Subelement: In-House Laboratory Independent Research

Budget Activity: 1 - Military Sciences

DESCRIPTION: In-house laboratory independent research provides a principal means for in-house laboratories to stimulate original work in science and technology related to their missions and interests of the Navy. Objectives are to initiate challenging research, capitalize on ideas germinating out of phase with budget cycles, enhance the competence of in-house laboratories, and attract and retain talented and creative scientists.

Research is supported in nine Naval Material Command Laboratories, in Bureau of Medicine and Bureau of Naval Personnel RDT&E field activities, in Naval Academy, and in the Naval Postgraduate School. Each laboratory submits annual report to Director of Navy Laboratories, and on-site reviews are conducted. Allocation of funds to laboratories is based on success and effectiveness of management in each laboratory's program.

2. FY 1972 Program: Following are typical research projects: Electro-optic effects are being applied to determine the electronic structure of solids; particularly, those which are potentially useful in infrared detectors.

Fluorocarbon derivatives are being synthesized to produce a number of novel compounds suitable for high density propellant binders with exceptional heat stability needed for resistance to aerodynamic heating effects in bombs or missiles.

Effects of high pressure on properties of solids are being studied; such information is needed to predict response of structural materials in missiles and warheads to impulsive loads.

Feasibility and potential benefits of applying the theory of Walsh functions to naval problems in communication theory, coding theory, optical data processing, and the design of digital equipment are being investigated.

Theoretical elastic stresses in marine propellers are being investigated using finite element numerical methods. Object is to develop procedures for predicting vibration characteristics of propellers.

Noise field inside a closed cavity produced by turbulent boundary pressure fluctuations impinging on one face is being measured to aid in understanding the current self-noise problem in submarine hydrophones at high ship's speed.

Flexural and compressive strength characteristics of ferrocement panels are being determined; such panels useful in constructing advanced shore bases.

Information is being gathered on distribution of marine mammal population in geographical areas of strategic interest to U.S. Navy. It is planned to present this information in a form usable by the Fleet ASW School and Fleet ASW operating forces. Knowledge of whale/porpoise population distributions and swimming behavior and their natural environment acoustic behavior can enhance the reliability of sonar target classification.

FY 1973 Planned Program: Basically a level-of-effort program.

Work will continue in fields of science most closely related to Navy's mission, in studies of environmental factors of interest to Navy, and in new concepts relevant to future Navy requirements. Since funds are used at the discretion of the Technical Directors to fund original work of interest to Navy initiated at times not in consonance with the budget cycle, the individual work units which will be active in FY 1973 cannot be predicted.

RESOURCES: ($ in Thousands)	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	12,549	14,066	14,491	Continuing	NA

IN-HOUSE INDEPENDENT LABORATORY RESEARCH

Chairman ELLENDER. Please provide for the record a listing of the laboratories involved in this program.

Admiral HOLMQUIST. I will be glad to do so.

(The information follows:)

Naval Air Development Center, Johnsville, Pa.
Naval Civil Engineering Laboratory, Port Hueneme, Calif.
Naval Coastal Systems Laboratory, Panama City, Fla.
Naval Electronics Laboratory Center, San Diego, Calif.
Naval Ordnance Laboratory, White Oak, Md.
Naval Ship Research and Development Center, Carderock, Md.
Naval Undersea Research and Development Center, San Diego, Calif.
Naval Underwater Systems Center, Newport, R.I.
Naval Weapons Center, China Lake, Calif.
Naval Weapons Laboratory, Dahlgren, Va.
Naval Postgraduate School, Monterey, Calif.
Naval Personnel and Training Research Laboratory, San Diego, Calif.
Naval Personnel Research and Development Laboratory, Washington, D.C.
Naval Medical Research Institute, Bethesda, Md.
Naval Aerospace Medical Research Laboratory, Pensacola, Fla.
Naval Medical Research Unit No. 1, Berkeley, Calif.
Naval Medical Research Unit No. 2, Taipei, Taiwan.
Naval Medical Research Unit No. 3, Cairo, Egypt.
Naval Medical Research Unit No. 4, Great Lakes, Ill.
Naval Submarine Medical Research Laboratory, Groton, Conn.
Naval Medical Neuropsychiatric Research Unit, San Diego, Calif.
Naval Biomedical Research Laboratory, Oakland, Calif.
Naval Dental Research Institute, Great Lakes, Ill.
Naval Medical Field Research Laboratory, Camp LeJeune, N.C.
Naval Academy, Annapolis, Md.

Senator YOUNG. Just how do you allocate the funds among these various laboratories?

Admiral HOLMQUIST. Many factors are considered in determining the amount of money allocated to the various laboratories. These include: past productivity of the laboratories' scientific research, analysis of stated requirements and the contribution of the program to specific naval technological needs; and the maintenance of a balance of research resources among the Nation's competent research performers; for example, the Naval Research Laboratory, academic and industrial laboratories.

Chairman ELLENDER. On page 62 of the descriptive summary, I note that one of the newest efforts being undertaken in a surface effects vehicle for the Arctic. Give us a brief description of the objective of this program.

Admiral HOLMQUIST. One of the objectives of the in-house laboratory independent research program is to conduct those basic studies necessary to advance many areas of Naval technology. Thus, when the Defense Advanced Research Projects Agency (ARPA) began its Arctic SEV program, it turned to a Navy in-house laboratory to perform or act as technical and contract monitor of a major portion of their program. The objective of the ARPA program is to develop the technology required to exploit the potential offered by SEVs as high performance military platforms for arctic operations. The vehicle has to be amphibious because the arctic environment includes snow, ice, water, frozen and thawed tundra and mud. The technology areas include propulsion, structures, control systems, navigation, terrain sensing, etc. This program will extend current SEV technology to provide a basis for developing all-weather arctic SEV's with greatly improved per-

formance capabilities. Potential goals are gross weights as high as 1,000 tons, payloads up to 300 tons, ranges as long as 3,000 nautical miles, speeds as high as 150 knots, and a remote operation endurance of up to 60 days.

Senator YOUNG. According to the descriptive summary, the planned fiscal year 1973 program is "basically a level-of effort" program, and yet you are requesting an increase of $425,000 in your fiscal year 1973 program for in-house independent laboratory research. Could you comment on the need for this increase since your fiscal year 1973 program is apparently remaining at about the same level as your fiscal year 1972 program?

Admiral HOLMQUIST. The funding requested for fiscal year 1973 will provide for a 3 percent increase over fiscal year 1972. This will permit essentially a level of effort program by offsetting increased costs caused by inflation and pay increases.

GENERAL PHYSICS

Chairman ELLENDER. Of the total requested for Research, $12 million is for a project entitled "General Physics." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Research

Title: Research

Subelement: 11 - General Physics

Budget Activity: 1 - Military Sciences

DESCRIPTION: This program provides the Navy and Marine Corps with the widest possible range of options for those offensive and defensive capabilities which are based ultimately on physical phenomena, and insures against technological surprise. Theoretical and experimental research attacks immediate and long range problems in optical radar and communications, surveillance, reconnaissance, missile guidance, nuclear power generation, electronic and electro-optic countermeasures, radiation shielding, quality control in the manufacture of vital naval materials, and new tools for research in Navy related sciences. Includes laser-related research in optical components and materials, non-linear propagation, gaseous and plasma physics, atomic and molecular systems, optical and acoustical holography, and electro-optical devices and theory. Solid state research continues to broaden the range of options available to the Navy and Marine Corps for selecting devices based on optical, electronic, magnetic, acoustic, or combinations of these properties. Superconductivity remains a challenging research area, with its potential for sensitive magnetic and infrared detectors, gravity meters, high power microwave generation, and shipboard motors and generators greatly reduced in size and weight.

WORK PERFORMED BY: (Representative) Academic: Brown, Providence, Rhode Island; Northwestern, Evanston, Illinois; and Case Western Reserve, Cleveland, Ohio; Non-profits: Midwest Research Institute, Kansas City, Missouri; and Battelle Memorial Institute, Columbus, Ohio; Industry: General Electric, Schenectady, New York; and Westinghouse, Pittsburgh, Pennsylvania; In-House: Naval Research Laboratory, Washington, D. C.; Naval Ordnance Laboratory, White Oak, Silver Spring, Maryland; Naval Air Development Center, Warminister, Pennsylvania.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM:

FY 1972 Program: Research is being done in the following areas:

Solid State Physics: Navy and Marine Corps needs for increasingly sophisticated electronic instrumentation with special emphasis on compact, multi-component integrated systems of great complexity require a major, continuing research effort on thermal, electrical, magnetic, optical and mechanical properties of solid state materials.

Molecular Physics: Success in determining fundamental structures of device materials, structural materials and drugs will enhance development of such items as new IR emitters and detectors and unique deep-submergence Naval vehicles, and will lead to new antiradiation drugs for Naval personnel. Another objective concerns development of new laser materials, time and frequency standards, and sensitive magnetometers, all of critical importance to submarine detection, atmospheric and underwater communication, signal processing, range-finding, and certain weaponry applications.

Radiation and Optics: To enhance capabilities in optical reconnaissance, surveillance, guidance, communications, fuzing, search and tracking, research is conducted on generation, control, transmission and detection of optical (including IR and UV) radiation.

Laser Physics: General goal is to advance laser technology with particular emphasis on physical understanding of lasers and interactions of coherent high intensity optical beams with matter. Progress in new materials, high powers and shorter pulse duration, and a broader range of wavelengths available has been rapid. Sufficient understanding of basic mechanisms is demanded for Navy to exploit their full potential across a broad set of operational requirements from range-finding and communication to weaponry.

Plasma and Ionic Physics: This area treats interactions of electrons, ions, atoms, molecules and photons with each other and with condensed phases. Research is directed toward solving problems involving ionospheric black-out, communications enhancement, power generation, gaseous discharge devices, laser systems, lightning gas breakdown and micro-electronics technology. New research in pulsed fusion techniques is being undertaken as a precursor to possible development of practical, controlled nuclear fusion aimed at supplying Navy with a new power source.

Superconductivity: Superconductivity is no longer a laboratory curiosity but rather a physical phenomenon capable of being understood in sufficient depth for exploitation on Navy problems in navigation, detection and surveillance. Present research is directed toward several orders of magnitude improvement in infrared detection, magnetometers, gravity meters, millimeter wave generators, low noise receivers and unique circuit elements. Shipboard motors and generators at superconducting temperature offer weight and volume reductions by 50% or more.

Physical acoustics.—Objectives are effective contributions to Navy needs to surveillance and Navy environment applications either in uses of acoustical waves as tools which detect physical states of solids and fluids applied to sensors or in the use of underwater acoustics in sonars. Special emphasis is given research on high and low temperature acoustics, high frequency acoustics, and nonlinear acoustics. Effort goes toward developing high temperature acoustic control and measurement devices, high frequency devices usable in microscopic examination of miniature structures and detecting incipient failure in aircraft or ship structures. Work is done on high precision ultrasonic techniques and devices for use in measuring thermodynamic and transport data in liquids and amorphous solids. These techniques and devices are applied to research on molten metals and molten glasses. Success could result in the discovery or development of fracture-resistant glasses for use as structural members in deep ocean submersibles, of unique molten-state coolants for Naval reactors, and of new alloys for use in the ocean environment.

Suborbital probes.—A more complete investigation of the earth-space coupling as related to physical sciences and life sciences is necessary to provide a strong data base preparatory to technological development of future military systems. In response, new and improved means of measuring atmospheric and near-space phenomena are being evolved. Balloon-borne sensors provide *in situ* measurements of physical atmospheric phenomena which affect [deleted] operational earth-space communications, and environmental constituents. High altitude balloon research results in high altitude missions [deleted] relating to [deleted] communications and vehicle influence on atmospheric pollution.

FY 1973 PLANNED PROGRAMS

Solid state physics.—6-MW operation of an NRL high-field magnet, expected during FY 1972, will provide 200-Kilo-oersted fields. In FY 1973 the new 6-MW and the old 3-MW systems will be combined to obtain 230-Kilo-oersteds.

X-ray analysis equipment at NRL will be fitted for low-temperature operation, and the unique far-infrared resonance spectrometer of the Magnetism Branch at NRL will be duplicated for use in conjunction with high-field magnets. This general extension of operating range, in terms of temperature and magnetic field, provides greatly increased information on solid state materials and phenomena of potential Naval use.

Increased support of work in magnetic semiconductors promises benefits in the form of control devices like transistors over which one has an additional influence via a magnetic field.

Optical, electrical, thermal and magnetic properties of solids will be studied with the goal of improving upon nature to the extent that specially prepared solids will perform better in new devices for detection, communication, display and information handling.

Molecular physics.—Photo chemical studies of molecules found in the atmosphere will be conducted with advanced techniques utilizing crossed laser and molecular beams. Complementary studies with ultraviolet excitation and mass spectroscopic analysis of the photofragments will also be pursued. Information obtained will be of importance in understanding dynamics and structure of the ion sphere and upper atmosphere. High precision molecular spectroscopy, using tunable spin flip lasers and Lamb dip spectroscopy, will be initiated. Basic data of molecular structure thus generated will be of fundamental importance to theoretical understanding of molecules and will augment our knowledge in the conception and design of gas lasers. Gas lasers are of increasing importance in Naval surveillance and weaponry.

Radiation and optics, and laser physics.—High-resolution photoelectric techniques will be developed for observing atomic and molecular spectra in both the ultraviolet and infrared regions for gases of atmospheric and astrophysical interest. Further efforts will be made toward developing tunable lasers in order that high-intensity, coherent, monochromatic light may be available in a continuously variable color range. Thus laser light can be tailored to the desired application.

It is necessary to understand propagation of laser light through the atmosphere for applications involving radar, designators and illuminators. Variable wind velocity, turbulence, time-dependent effects and pulsed beams will be considered in propagation studies. These calculations will be complemented by over-water measurements, tests under a variety of atmospheric conditions and correlation with atmospheric turbulence and meteorological conditions over the ocean.

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Plasma and tonic physics.—Plasma diagnostic techniques will be extended to fast heating discharges in the theta-pinch geometry. Studies of altitude and magnetic effects on explosive radiation will continue. Excitation and decay in Co_2 and CO lasers will be investigated to determine power capability and pulse characteristics necessary for laser radars and illuminators.

Thermonuclear fusion research will be undertaken on a broad front. A prime aspect will be research to demonstrate the feasibility of a [deleted] reactor capable of producing 200 to 1000 MW of power and suitable for Naval applications.

Superconductivity.—Research will continue in order to achieve the full energy gradient expected for the niobium cavities. Metallurgical and processing techniques will be developed to raise the gradient factor from 2 to 4 MeV/foot. Construction and assembly of further accelerator modules will continue as time for processing allows.

Demonstrate the feasibility of portable superconducting magnetometers for ASW.

Physical acoustics.—Continuing development of high temperature and flow measurement devices is planned for quality control in basic metal production and detection of instability in high temperature engines. Other efforts include investigation of interaction between optical energy and acoustic wave generation at high frequency, nonlinear acoustic refraction, diffraction, finite amplitude noise propagation, and subharmonic generation in the presence of nonlinear boundary behavior; and acoustic emission associated with stress changes in solids is planned for fatigue prediction.

Suborbital probes.—Increased emphasis on the operating environment imposes urgent needs for base data to properly analyze disturbing effects of vehicles operating in the stratosphere. An international network of atmospheric sampling sites will, by means of sensors mounted on balloon probes, provide data on several environmental factors including: water vapor, ozone and stratospheric dust.

A program is envisioned to provide ballistic measurements using data obtained from satellite based infrared spectrometers.

The Skyhook balloon program will investigate economical, heavy load balloons and launch techniques. Anticipated experiments involve weights and altitude capabilities well beyond present state-of-the-art.

Resources (in thousands of dollars):

R.D.T. & E., N. funds for fiscal year 1971, $9,669; fiscal year 1972, $11,809; fiscal year 1973, $12,041; additional funds to completion are continuing; and the total estimated cost is not available.

General Physics

Chairman Ellender. Would you describe some of your major efforts in this project for fiscal year 1973?

Admiral Holmquist. Although our efforts on a project as broad as general physics are correspondingly broad, many such efforts can be conveniently grouped according to their technological impact. One such grouping which would comprise a major collective effort relates to lasers. We shall support a number of investigations at the Naval Research Laboratory and through our contract research program in molecular spectroscopy or the optical propeties of gases. A knowledge of these properties is necessary for the design of gas lasers and for understanding the propagation of laser light through the atmosphere. The Navy is interested in lasers for range-finding, target designation, communications, and weaponry.

The optical behavior of solids will also receive considerable attention. While in the past we have been limited to a relatively small number of available materials for solid state devices, we are now on the threshold of being able to design and fabricate solids for the particular job at hand. We plan to investigate new materials for use in solid state lasers, both the conventional pumped type and the electrically excited semiconductor junction type. Other solids will be tailored for

laser detectors, laser components such as windows and lenses, and special devices like those making use of the nonlinear efforts of high-intensity laser light for frequency shifting. Controlling the operating characteristics of the laser or detector allows us to take advantage of particular frequencies best suited for atmospheric propagation, eye safety, or detection efficiency. A long-range goal is the completely tunable laser: a device with all the advantages of a laser (single color, high intensity, narrow beam) and which can be adjusted to emit a beam with a continuously variable wavelength.

In a somewhat related effort we plan to expand our work in integrated optical circuitry. In these small circuits light signals play the role of electrical signals, with the advantages of reduced size and weight and freedom from interference. Because of the high frequency of the light involved, the information-carrying capacity is greatly increased. The advantages offered by such circuits in control and communications in naval planes and ships are exciting.

A major effort in the field of experimental solid state physics will be the characterization of magnetic phenomena in materials for improved radars, sonars, and communciations and control equipment by means of an improved magnet facility at the Naval Research Laboratory. A new 6-million-watt high-field magnet will be placed into operation to give the huge field of 200 kilooersteds. With the older 3-million-watt magnet, fields of 150 kilooersteds were obtained.

Thermonuclear fusion research will be undertaken in an effort to demonstrate the feasibility of a [deleted] reactor capable of providing 200–1,000 megawatts of power suitable for naval applications.

An important goal of our superconductivity program is to demonstrate the feasibility of portable superconducting magnetic devices for submarine detection. We shall also carry out theoretical and experimental studies of lightweight superconducting propulsion machinery for ships. Josephson junction detectors for infrared and radar waves will be tested in linear arrays for increased signal strength and directionality.

Skyhook Program

Senator Young. Last year during the hearings, Admiral Holmquist discussed the Skyhook program. Did you meet your objectives for fiscal year 1972 in this program, and what are your objectives for fiscal year 1973?

Admiral Holmquist. Yes, sir. All Skyhook objectives for fiscal year 1972 have been met to date. There have been 26 ONR sponsored scientific balloon flights thus far with 23 successes. Although three balloon failures occurred, all scientific packages scheduled for flights have been flown.

As to fiscal year 1973 objective, Skyhook will continue to provide reliable and effective platforms and sensors to measure and evaluate properties of the earth's atmosphere. Scientific interest will continue in the solar and cosmic influences area. Additionally, a new program of sampling stratospheric constituents on a worldwide basis has begun as a cross agency effort between ONR and the Department of Transporation. Seventy-one balloon flights and probes are foreseen in fiscal 1973 with 48 of these directly related to the stratospheric sampling program.

Chairman ELLENDER. I note in the descriptive summary of your program for fiscal year 1971 the following statement: "An offshoot of electron resonance experiments in solids is the development of a spin labeling technique whereby magnetic complexes are attached to biological molcules. This technique allows the molecules to be traced, studied, and identified by means of the magnetic complex, and has possible uses for identifying trace materials—including drugs—in the blood." Has any use been made of this technique in the Navy's drug abuse program?

Admiral HOLMQUIST. Yes, sir. The free radical assay technique (FRAT) is used extensively throughout the Navy for detection of illicit drug users.

Senator YOUNG. Just why do you need the increase of $232,000 that you are requesting for fiscal year 1973?

Admiral HOLMQUIST. A portion of the requested increase of $232,000 over fiscal year 1972 is necessary to support modest expansions in our research concerning gas lasers and solid state lasers, integrated optical circuitry, magnetic phenomena in materials, thermonuclear fusion and superconductivity. All of these areas have important implications for improving naval communications, navigation, and weaponry. The additional funds will also help alleviate the increased costs associated with inflation and pay raises.

NUCLEAR PHYSICS

Chairman ELLENDER. Of the total requested for research, $2.9 million is for the project entitled "Nuclear physics." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Research

Title: Research

Subelement: 12 - Nuclear Physics

Budget Activity: 1 - Military Sciences

DESCRIPTION: This subelement comprises theoretical and experimental investigations necessary to clarifying the penetration and damage in naval structures and materials caused by radiation from nuclear weapons and nuclear power sources; evolving nuclear techniques and specialized sources of nuclear radiation for application to problems such as the interior of nuclear weapons, production of new types of electronic devices by ion implantation, and ultrasensitive analysis of materials; providing expert advice on a continuing basis concerning military questions related to nuclear devices; and assessing implications to the Navy of world-wide new developments in nuclear technology.

FY 1972 Program: Research efforts are oriented to evolving techniques and equipment for analyzing critical impurities on and below surfaces by nuclear probes; production of specialized semiconductor devices by ion implantation. Radiation damage in materials and solid state components is being produced and analyzed by nuclear radiations in connection with nuclear weapons effects studies. Radioisotopes are produced and analyzed for special applications in non-nuclear areas. Investigations are underway in nuclear reactions and scattering using various types of charged particle beams from the cyclotron as well as electrons and gamma rays from the linac. A new program in the analysis of crystals and crystal impurities by means of ion beam channeling is being expanded. Experimental data derived from these efforts are undergoing theoretical analysis preparatory to making theoretical predictions about the interaction of nuclear radiations in different environments.

FY 1973 Planned Program: Fast neutron radiation damage in breeder reactor materials and thermonuclear reaction containers will be studied by simulating the damage with heavy ion beams from the Van de Graaff and Cyclotron. Theoretical calculations of the penetration, absorption, and damage production will be made.

Significant improvements in surface trace analysis will be derived from further investigation and development of x-ray fluorescence produced by various charged particle beams from the Van de Graaff and Cyclotron.

New solid state devices will be produced by implanting heavy ions into various substrates. These devices may have improved electronic or magnetic properties and exhibit greater hardness against radiation.

Further calculations will be made on the penetration of an intense laser beam through the atmosphere to include pulsed conditions and other effects.

Techniques to measure and analyze the x-ray spectrum from pulsed weapon-simulator machines will be further investigated and developed. Work will proceed on the measurement of pulsed neutrons from higher energy x-ray simulators and controlled thermonuclear generators.

A theoretical study will be made on the feasibility of producing a gamma-ray laser.

The Cyclotron, Linac, and Van de Graaff will provide beams of particles and radiations for testing critical components which are to be subjected to radiations in outer space or to radiations from a nuclear weapon.

To increase the understanding of natural radiations in the upper atmosphere, experiments will be placed on high altitude balloon flights to determine the composition of "very heavy" (above silicon) cosmic ray particles.

Research will be performed in the absorption and penetration of various radiations, including charged particle beams. Nuclear cross sections of interest to nuclear weapons or nuclear power applications will be measured.

RESOURCES: ($ in Thousands)	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	2,629	2,810	2,857	Continuing	NA

NUCLEAR PHYSICS

Chairman ELLENDER. Give us an idea of your major accomplishments during fiscal year 1972 for which $2.9 million was provided.

Admiral HOLMQUIST. Major accomplishments realized from the nuclear physics program during fiscal year 1972 include:

Ion implantation techniques for improving the radiation resistance of critical electronic components.

Devised method for using the Van de Graaff and cyclotron accelerators for predicting and assessing radiation damage in reactor materials.

Produced radioisotopes (CC 129) which show important applications for diagnosis and treatment of myocardial infarction (blood clotting).

Developed technique for using neutrons in cancer therapy.

Senator YOUNG. Just why do you need the $47,000 increase you are requesting for fiscal year 1973?

Admiral HOLMQUIST. The requested funding for nuclear physics provides essentially a level of effort program for fiscal year 1973 with the $47,000 increase absorbing some of the additional inflationary costs and pay increases.

CHEMISTRY

Chairman ELLENDER. Of the total requested for research, $4 million is for the project entitled "Chemistry." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

RESEARCH

Description.—This research is conducted to create and improve materials required by the Navy and Marine Corps (especially those for use in harsh environments); to provide information needed to synthesize and characterize new materials with desirable combinations of properties not now available; to provide information needed to improve Navy fuels, propellants, components for ships and shore structures and to exploit and extend use of analytical tools for the solution of material and environmental problems arising in naval operations.

Program comprises a contract research program supported by the Office of Naval Research and an in-house program carried out at the Naval Research Laboratory. Research includes projects in: (1) Physical Chemistry, (2) Solid State Chemistry, (3) Analytical Chemistry, (4) Chemical Synthesis and Mechanisms, and (5) Chemical Materials.

Work performed by.—(Representative) Universities—University of Illinois, Urbana, Illinois; University of Washington, Seattle, Washington; University of Minnesota, Minneapolis, Minnesota; University of Miami, Coral Gables, Florida; University of Missouri, Rolla, Missouri; University of Georgia, Athens, Georgia; University of California, San Diego, California; University of California, Los Angeles, California; Harvard University, Cambridge, Massachusetts; Princeton University, Princeton, New Jersey; New York University, New York; Wayne State University, Detroit, Michigan; Michigan State University, Lansing, Michigan; Industrial—TRW, Incorporated, Redondo Beach, California; Pennwalt Chemical Corporation, King of Prussia, Pennsylvania; Olin-Mathieson Company, New Haven, Connecticut; General Telephone & Electronics Laboratory, Bayside, New York; In-House—Naval Research Laboratory, Washington, D.C.; Naval Ordnance Laboratory, White Oak, Silver Spring, Maryland.

Fiscal year 1972 program.—Current program contains research on following problems: Optimization of known [deleted] in advanced aircraft; synthesis and characterization of new polymers [deleted] studies of thermal and oxidative degradation of synthetic polyol ester oils in thin films; [deleted] relations based on polymer properties and solvent characteristics; absorption studies of graphite crystals and fibers; diffusion studies in solid electrolytes; the state of aggrega-

tion of inorganic species in aqueous solutions; studies of the effects of added cations and anions on the kinetics and mechanism of iron oxidation in aqueous solution containing varying amounts of iron (II) ions; the use of commercially available intramolecular excimer formers in organic lasers and the synthesis of appropriate compounds for further work; the role of excimer formation in polymer photolysis; the construction of a rapid-mixing flow laser for the study of simple exo- and endothermal reactions; the study of chemical kinetics and excited state spectroscopy using pulsed ruby-pumped tunable dye laser sources.

Fiscal year 1973 planned program.—Emphasis will begin to shift from research on heat-stable polymer systems to those with electrical, magnetic, and optical functionalities. Surface chemical and other physical chemical researches will be undertaken in which emphasis will be on phenomena at molecular level rather than those describable only in thermodynamic terms. Further emphasis may be given to computer-controlled chemical experimentation and chemistry of excited states. Specific research includes such aspects as the effect of metal surfaces, additives and limited oxygen availability on the degradation of thin films of lubricants; potential chemical laser systems; far-infrared lasing action in large organic molecules by means of a CO_2-laser excitation; synthesis of advanced inorganic materials with long-range implications for such diverse applications as high temperature fluids, absorption, refrigeration, free radical sources, gas-phase deposition of metal oxides, oxidants and fluorocarbon substitutes; chemi-ionization phenomena using NRL-developed double ion source techniques; and ionic reactions involving low-sensitivity nuclei using single enhancement and pulsed laser methods. Work will begin on the surface energy and wetting properties of high energy surfaces including liquid metals and ceramics.

Resources (in thousands of dollars):
R.D.T. & E., N. funds for fiscal year 1971, $3,671; fiscal year 1972, $3,965; fiscal year 1973, $4,013; additional funds to completion are continuing; and the total estimated cost is not available.

CHEMISTRY

Chairman ELLENDER. Can you give us an idea of how the funds you are requesting will be allocated between Navy in-house facilities, industrial organizations, and educational institutions?

Admiral HOLMQUIST. The distribution of funds for chemistry is as follows: Navy in-house, $2,173,000; industrial, $565,000; and universities, $1,275,000.

Chairman ELLENDER. I note in the descriptive summary that the Advanced Research Projects Agency has advanced funds for certain projects in which it is interested. Please tell us what these projects are and indicate how much has been advanced for each.

Admiral HOLMQUIST. The Advanced Research Project Agency has provided funds in fiscal year 1972 for the following projects: Washington University-Monsanto Corp., joint project on high-performance composite materials, $300,000; Stanford University, new superconducting materials for possible application to sensitive magnetometers and compact electric propulsion machinery, $225,000; Pennwalt Corp., candidate materials for reentry vehicle nose cones, $100,000 to augment ongoing ONR program; University of California, Berkeley, polymers with graded properties such as bulk strength combined with low-friction surfaces, $53,697; National Bureau of Standards, polymers which can be used as detectors of heat or pressure changes, $35,000.

Senator YOUNG. Please indicate the need for the increase of $48,000 you are requesting for fiscal year 1973.

Admiral HOLMQUIST. The requested funding for chemistry provides essentially a level of effort program for fiscal year 1973, with the $48,000 increase absorbing some of the additional inflationary costs and pay increases.

MATHEMATICAL SCIENCES

Chairman ELLENDER. Of the total requested for research, $8.6 million is for the continuing project entitled "Mathematical Sciences." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Research

Title: Research

Subelement: 14 - Mathematical Sciences

Budget Activity: 1 - Military Sciences

DESCRIPTION: This research provides for extension, refinement and application of mathematical and computer techniques which can be employed by the Navy and Marine Corps in the performance of their missions.

The program includes research directed towards specific military problems drawn from areas of logistics, intelligence, and weapons systems analysis and engineering, and the development of new mathematical and computer tools. This program includes research in:

Theories and Techniques for Logistical Analysis and Operations Research - Provides for development of mathematics relevant to naval logistics; and derivation and testing of methods applicable to planning and control of logistic and related naval operations;

Mathematical Statistics and Probability - Emphasis on research for estimation of life-length of components, on systems reliability, on methods for estimating and comparing weapons systems performance, and on techniques for the analysis of surveillance and naval engineering data;

Applied Mathematics and Numerical Analysis - Research emphasis on mathematical and computer tools for naval engineering and design;

Information Sciences - Research is conducted on information processing, storage and retrieval. This research provides design tools for digital and analog computer programming of modern information processing systems (e.g., surveillance, logistics, and strategic systems); and

Methodology for Systems Analysis - Extends and modifies operations research techniques for application in specific naval operational and development contexts.

WORKED PERFORMED BY: (Representative) Universities-- University of Texas, Austin, Texas; University of Pennsylvania, Philadelphia, Pennsylvania; Florida State University, Tallahassee, Florida; University of California, Berkeley, California; Massachusetts Institute of Technology, Cambridge, Massachusetts; Stanford,University, Stanford, California; Cornell University, Ithaca, New York; Georgia Tech, Atlanta, Georgia; University of Illinois, Urbana, Illinois; Case Western Research University, Cleveland, Ohio; Non-profit - Stanford Research Institute, Stanford, California; Research Analysis Corporation, McLean, Virginia; IIT Research Institute, Chicago, Illinois; Industry - IBM, Gaithersburg, Maryland; Bunker-Ramo Corporation, Westlake Village, California; Systems Development Corporation, Santa Monica, California; In-House - Naval Ship Research and Development Center, Carderock, Maryland; Naval Research Laboratory, Washington, D.C.; and Navy Schools - Naval Academy, Annapolis, Maryland; Naval Postgraduate School, Monterey, California.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAM:

FY 1972 Program: Emphasis is on linear and integer programming and network analysis combined with applications of this work to control of Navy logistic processes. Research in numerical analysis, combinatorial mathematics, and differential equations is in progress as it contributes to naval problems, such as fluid flow, ship control and satellite ocean surveillance. Research in computer graphics, time-sharing and pattern recognition is pursued with the objective of extending Navy utilization of advanced computer-based information systems in areas of intelligence, tactical command and control and management systems.

FY 1973 Planned Program: Emphasis will be on non-linear optimization, general purpose simulation techniques, and improved management science techniques in areas of forecasting, data aggregation, and econometric research, combined with applications of this work to the control of Navy logistic processes.

Information systems research will be centered around four areas of Navy interest: time-sharing development, systems for large file data processing, development of methodologies to improve system communication and standardization, and man-machine symbiosis. Emphasis will be placed upon improving the state of optical processing, logic and storage techniques.

Increased emphasis will be directed on improved methodology for performing statistical computations especially in areas of techniques for testing algorithms, linkage of algorithms into statistical processing systems, techniques for handling large aggregates of interrelated data, validation of simulation, and other topics which make statistical computations more applicable to current Navy problems.

Research in applied mathematics and numerical analysis will concentrate on advanced research in control theory, perturbation techniques, finite element methods, and software evaluation.

Systems analysis research will emphasize research directed toward new display technology, aerodynamic technology, and new applications of advanced systems analysis procedures to naval mine field and air ASW operations.

RESOURCES: ($ in Thousands)	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	7,866	8,396	8,593	Continuing	NA

MATHEMATICAL SCIENCES

Chairman ELLENDER. In the descriptive summary, I note that the Naval Academy and the Naval Postgraduate School in Monterey, Calif., are listed among the Navy organizations performing work on this project. Tell us briefly the nature of the work these two schools perform.

Admiral HOLMQUIST. The work at the Naval Academy is limited to the arrangement and conduct of a research conference to identify and establish efficient numerical methods for the solution of naval engineering problems. The work at the Naval Postgraduate School is research by members of the staff on new techniques for the analysis of statistical signals such as those generated by acoustic sensors in ASW, and on methods for the evaluation and control of equipment reliability. In the latter, particular attention is given to the reliability of military computers.

Senator YOUNG. How are your funds allocated between Navy in-house facilities, industrial organizations, and educational institutions?

Admiral HOLMQUIST. For in-house facilities, we are allocating $1,489,000; for industrial organizations, $1,774,000; and for educational institutions, $5,056,000.

Chairman ELLENDER. The $8.6 million you are requesting for mathematical sciences for fiscal year 1973 is $197,000 more than the funds provided in fiscal year 1972. Just what is your need for this increase?

Admiral HOLMQUIST. The increase of $197,000, which is about 2.5 percent of the program, will be used to strengthen our efforts to build improved techniques for the analysis of sonar and radar signals in view of the fundamental importance of such research in antisubmarine warfare and other surveillance areas. In addition, there will be selected new initiative in understanding the complex numerical aspects of naval engineering analysis; such analysis consists of the application of advanced computing capability and is currently severely limited by our insufficient understanding of the appropriate theory and the necessary numerical procedures and computing software. The increased funding will help our effort in both these important research areas.

ELECTRONICS

Chairman ELLENDER. For fiscal year 1973, $11.2 million is requested for the project entitled "Electronics." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Research

Title: Research

Subelement: 21 - Electronics

Budget Activity: 1 - Military Sciences

DESCRIPTION: The electronics research program is directed to making available new and improved electronic components, techniques and systems which will operate effectively in all operational environments. Research is oriented to fulfill requirements for design and use of new and improved communications, electronic countermeasures, radar, navigation, Identification Foe or Friend (IFF), fire control, data processing and other naval weapons systems.

Major categories are Electromagnetic Wave Propagation and Radiation, involving generation, radiation, propagation, refraction, detection and disturbances of electromagnetic waves of all frequencies, with emphasis on the properties of millimeter, very-low and extremely low-frequency regions of the spectrum; Physical Properties of Solids, Liquids and Gases, including studies in electron and ion transport, semiconductor electronics, magnetic-effects, non-linear phenomena, plasma, gaseous and solid state electronic characteristics, such as radiation-induced defects in semiconductors, and instabilities in plasmas; Electronic Components, involving investigations, as in integrated circuits, parametric amplifiers, masers, and low-noise detectors and high-power generators; and Electronic Theory, which concerns itself with circuits, coding, control, and communications theory, including the application of modern computer techniques to problems of analysis and synthesis.

WORK PERFORMED BY: (Representative) Universities - Harvard, Cambridge, Massachusetts; University of California, Berkeley, California; Stanford University, Stanford, California; Industry - Sanders Associates, Nashua, New Hampshire; Hughes Research Laboratory, Malibu Beach, California; Lockheed Missiles and Space Company, Palo Alto, California; In-House Laboratories - Naval Electronics Laboratory Center, San Diego, California; Naval Research Laboratory, Washington, D. C.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM:

FY 72 Program: Major research efforts pertain to improving our capabilities in new solid and surface-state electronics, including effects of nuclear radiation on devices; uses of high-"Q" cavities and other techniques of the super-conducting state; high resolution, collection and interpretation of radar scattering from the sea and man-made objects such as surface ships; new generators of electromagnetic energy - e.g., relativistic electron beams, cooled microwave tubes or electron-beam semi-conductor interactions; antenna theory; coding and communication theory; quantum electronic devices; microwave holography, and infrared materials and devices; image-processing and pattern recognition methodology; and computer-aided circuit analyses. Investigations are being made on use of color centers in alkali halide crystals for high density data storage and readout; systems theory and related applications to minimizing number of components while maximizing performance such as in shipboard electronic circuits; and improvements in thin-film and bulk micro-electronics components.

FY 1973 Planned Program: Navy research efforts in electronics for FY 1973 concern a basic electromagnetic problem associated with antennas in various media; propagation of electromagnetic waves in solids and through turbulent gases and plasmas; behavior of millimeter and sub-millimeter waves; advances in synthetic antenna aperture methods for improving resolving power and

gain of large antennas and arrays; and communications, control, coding and digital theory. The Tri-Services electronics program will be oriented to investigations in microwave acoustics, quantum electronic techniques, radio-wave propagation and other relevant areas of the electronic sciences. Emphasis will be directed to clarifying fundamental limitations in atomic and molecular time and frequency standards. Efforts will be directed to novel electron device evolutions, exploiting surface and solid state, as well as plasma phenomena.

The propagation program will continue collection of radar scattering information from land, sea and man-made targets with major emphasis on mapping of the sea surface to determine what phenomena can be detected and to study the effects of target passage through the area mapped.

Emphasis will be given to optimization of film deposition techniques, vacuum deposition, chemical vapor transport, and liquid phase epitaxy in conjunction with film-thinning techniques such as sputter etching to obtain sub-micron thick films; studies of electron device materials necessary to construct, understand and control thin film electron devices; microwave tube research for broader band tubes as well as special purpose, single function tubes.

Very-low-frequencies analysis will be conducted on the effect of "rough" waveguides on propagation characteristics of signals at those frequencies. Measurements will be made of the troposphere, using radar sounders, with the aim of early fleet use of this technique for determining ranges of VLF communications systems.

RESOURCES: ($ in Thousands)	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	8,991	10,018	11,197	Continuing	NA

TRISERVICE ELECTRONICS PROGRAM

Chairman ELLENDER. Will you provide a tabulation for the record showing the projects being performed under the triservice electronics program, the participating institutions and the amount being contributed by each of the services for these projects for fiscal year 1973?

Admiral HOLMQUIST. I will be glad to do so.

(The information follows:)

Listing of Projects, Participants, and Funding
for Tri-Service Electronics Program

Projects	Institution	FY 1973 (in thousands) Navy	Army	Air Force
Solid State Electronics Circuit and Control Theory, Antennas and Radio Wave Propagation	Harvard University (Division of Engineering and Applied Physics)	170	170	170
Communications Theory, Radio Wave Propagation, Atomic and Molecular Beam Devices and Techniques	Massachusetts Institute of Technology (Research Laboratory of Electronics)	343.3	343.3	343.3
Masers and Lasers, Atomic and Molecular Beams and Spectroscopy	Columbia University (Radiation Laboratory	166.7	166.7	166.7
Surface and Solid State Electronic Devices, Digital Data Technology, Pattern Recognition, Radio Wave Propagation, Acoustic Theory and Devices	Stanford University (Microwave Laboratory and Electronics Laboratories)	246.6	246.6	246.6

Projects	Institution	Navy	Army	Air Force
Masers, Lasers, Electromagnetic Theory, Electronic Components, Quantum Electronics and Communications Theory Surface and Solid State Electronics, Control Theory, Circuit Theory, Digital Technology	Polytechnic Institute of Brooklyn (Microwave Research Institute)	166.7	166.7	166.7
	University of Illinois (Coordinated Sciences Laboratory)	340	340	340
Electromagnetic Radiation and Propagation, Integrated Circuits, Electron Microscopy, Quantum and Optical Electronics, Computer Sciences, Bio-electronics.	University of California (Electronics Research Laboratory)	166.7	166.7	166.7
Semi-conductors, Quantum Electronics and Lasers, Switching and Automatic Theory, Control Systems	University of Southern California (Electronic Sciences Laboratory)	166.7	166.7	166.7
Information Systems, Filter Theory, Plasma Electronics, Solid-State Theory and Devices	University of Texas (Electronics Research Center)	133.3	133.3	133.3
	TOTALS	$1,900.	$1,900.	$1,900.

Chairman ELLENDER. I note that the $11.2 million you are requesting for fiscal year 1973 is $1.2 million more than was provided for fiscal year 1972. Why do you need this increase?

Admiral HOLMQUIST. This increase is required to augment research in microwave and millimeter high-power tubes, leading to usage in jamming of missile guidance systems, as well as for highly accurate radar and covert communications systems. In addition, more emphasis will be given to high-speed radio direction finding antenna arrays and methods to cope with sophisticated enemy communications methods, such as short-burst transmissions. Increases are also required in radar signature analysis, reliable electronic components which will operate in nuclear environments and for studying fundamental limitations in the characteristics of lasers, atomic clocks, low-noise receivers and other devices employed in communications, navigation, fire control, and electronic countermeasures systems.

MATERIALS

Chairman ELLENDER. Of the total requested for research, $10.7 million is for the project entitled "Material Sciences." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Research

Title: Research

Subelement: 22 - Material Sciences

Budget Activity: 1 - Military Sciences

DESCRIPTION: Research is directed toward improving properties and performance of materials currently employed by Navy and Marine Corps and providing information needed for orderly development of new materials required for future naval applications. Theoretical and experimental investigations are carried out under the headings: Metals and Alloys; Ceramics, Glasses and Related Inorganic Solids; Corrosion, Deterioration and Protection; High Temperature Materials/Materials of Unique Properties; Composite Materials; Radiation Resistant Materials; Polymers, Protective Coating Materials, Lubricants and Fluids.

WORK PERFORMED BY: (Representative) Universities - Brown, Providence, Rhode Island; Northwestern, Evanston, Illinois; and Case Western Reserve, Cleveland, Ohio; Non-profit - Midwest Research Institute, Kansas City, Missouri; and Battelle Memorial Institute, Columbus, Ohio; Industry - General Electric, Schenectady, New York; and Westinghouse, Pittsburgh, Pennsylvania; In-House - Naval Research Laboratory, Washington, D.C.; Naval Ordnance Laboratory, White Oak, Silver Spring, Maryland; Naval Air Development Center, Warminister, Pennsylvania.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM:

FY 1972 Program: Research on metals and alloys involves the nature and behavior of imperfections in the solid and liquid states and their influences on structure sensitive properties, the constitution and structure of alloy systems, deformation and fracture behavior, brittle behavior of ultra-high strength steels, effects of variations of radiation environment, electronic structures, and thermodynamic properties of alloy phases.

Ceramic and glass research covers the physical and mechanical structure of glasses and their related optical, infrared and structure properties. Unique properties of ceramics and glasses are being exploited or advanced in terms of ceramics experiencing mechanical loads; refractories for high temperature uses; functional ceramics for electronic, insulating, sonar and transparency use; and new glasses for high temperature infrared windows.

All metal embrittlement reactions are being investigated in terms of imposed stress-fatigue environment and in terms of structurally disturbed metal surfaces. Corrosion and deterioration of materials in service continue as major problems for the Navy.

Research is being done to obtain information necessary to develop unique high temperature resistant strong alloys.

Program includes research on composite materials aimed at understanding the nature of the matrix material and those of the dispersoids, interfacial bonding which affects strength and mechanical properties, fatigue behavior, response to alternating stresses, processing variables and the combined influence of those factors which affect deformation and fracture behavior of these unique materials.

Research on radiation resistant materials is directly related to improved materials for nuclear power reactors. Materials used in power reactors are degraded by nuclear radiation.

Polymer research contributes to the synthesis of high temperature polymers and the structure and properties of elastomers. The protective coating program concerns rain-erosion problems, and surface finishes for high temperature aircraft and propulsion components.

FY 1973 Planned Program: Work on brittle fracture (temper embrittlement) will turn towards preventing embrittling concentration of impurity atoms at grain-boundaries. The aim is to establish fracture criteria benefiting hi-strength sheet alloys. Application of holographic observations and holographic interferometry will be extended. Initial applications will be made of laser holography to the measurement of spatial displacements of interfaces during phase transformations for the case of laser beam heating. Principal aim is to devise the technology for using laser beams in fabrication of such materials as Ti-alloys, composites, or other emerging new materials of Navy interest. In Radiation Resistant Materials, emphasis will be placed on studies of metal damage effects resulting from lattice displacements and transmutation effects, of importance to projected intermediate-fast-spectrum and controlled-thermo-nuclear-fusion power reactors.

Selected program sections in ceramics, related to mechanical studies and defect/solid chemistry, may be slightly reduced in coverage. Limited new work will begin on microwave radar absorbing materials and on vulnerability studies of materials to very high thermal loading conditions. Further, electrical behavior and piezoelectric properties and stability of sonar ceramics will be determined. Piezoelectric ceramics for transducers will be studied. New directions will be added to improve ceramic turbine blade materials. Efforts will continue in control of cold working of (brittle) ceramics. Deformation and fracture of ceramics (including thermal and mechanical shock) will be analyzed by transmission and scanning microscopy. Work on structure and dynamic processes in glass affecting long term strength and means of strengthening glass will be accelerated.

New research avenues will be pursued in broad areas of corrosion and surface protection. In aqueous corrosion, the nature of passive films and factors which make them protective will be studied. Increased work on pitting corrosion (passivity film breakdown) on stainless steel and aluminum alloys is planned. Stress corrosion research will emphasize the more sensitive microstructures and precipitate morphology of aluminum alloys, titanium alloys, and steel. Environmental factors such as hydrogen-induced cracking will be oriented toward the question of subcritical flaw growth due to chemical factors in crack tip regions. Oxidation research will include studies on the adherence of oxide scales to base metals which offer corrosion protection. Silicide and aluminum coatings on nickel superalloys and refractory metals will be examined in detail.

Anticipated emphasis in composite research includes experimentations of "in development" type composites regarding their resistance; e.g., to fatigue and creep failures. A close evaluation will be given to findings on the relationship between design of aircraft-oriented organic matrix composites and their strength and environmental resistance, followed by necessary redirection of the program.

Increasing Navy interest in application of superconductors to electrical generators and motors has resulted in a selected number of research programs on superconducting materials. It is planned to cautiously continue/enlarge such research to bring about a clearer understanding of such materials in terms of their physical (atomic and electronic) structure with the aim to slightly raise their transition temperatures and thereby make such materials more attractive in terms of their superconductivity behavior.

RESOURCES: ($ in Thousands)	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	9,102	9,791	10,672	Continuing	NA

Chairman ELLENDER. Could you give us some idea how this $10.7 million will be divided between Navy inhouse facilities, industrial organizations, and educational institutions?

Admiral HOLMQUIST. Yes, sir. The program funds, as now planned, will be divided in this manner: to inhouse facilities, $5,690,000; to universities, $2,695,000; to industry, $1,688,000; and to nonprofit institutions, $599,000.

Chairman ELLENDER. Are you undertaking any new projects in material sciences for fiscal year 1973?

Admiral HOLMQUIST. Yes, sir. The following new programs in the materials area will be pursued:

Study of new metallic magnetostrictive materials.—To develop suitable materials of high magnetostriction which can operate in a wide critical temperature range. Such materials (involving rare earth elements) are sought for high-frequency acoustic delay lines, information storage, and optical correlation in radar and sonar applications and others.

Superconducting materials.—Encompasses new groups of metallic materials which have potential for higher and more efficient transition temperatures. Such materials will play a key role in the exploitation of superconduction phenomenon in the practical development of (*a*) electrical machinery and power systems of Navy interest and (*b*) toward higher efficiency and selectivity in electronic circuits, antennas, very low frequency communications, and magnetic airborne and IR detection.

New solid and liquid laser materials.—Develop semiconductor-type laser materials and those which have structures similar to polymers. Aim is to achieve higher operating temperatures and efficiencies. Also, studies on laser effects in materials to understand damage mechanism caused by high-intensity laser beams. Investigate interaction of materials operating in optical and nuclear radiation environment. Typical benefits to accrue are improved optical windows and optical components. New or improved materials sought by implantation of fast ion beams, using particle acceleration and control of electronic-optical-mechanical properties.

New specialty glasses.—Studies those leading to the tailoring of properties for a broad spectrum of applications (ultraviolet, IR transmitting optical elements, various radiation detectors).

New advanced ceramic materials for high-temperature bearings.—For improving reliability and efficiency of naval machinery (turbines, helicopter rotors, ocean engineering equipment).

Studies on the processing and joining of ceramics.—Identifies those critical variables, such as temperature, in sintering processes which control the uniform rate of shrinkage in ceramic bodies, and to learn of and identify factors involved in joining ceramics to ceramics and ceramics to metal of suitable strength integrity. Related research on ceramic fractography will be carried out. Initial candidate materials will be high-strength alumina and silicon nitride. One typical area to benefit involves high-speed radomes.

Senator YOUNG. Just what is the need for the $881,000 increase you are requesting for fiscal year 1973?

Admiral HOLMQUIST. In addition to providing funding necessary for the new programs described in the preceding answer, the requested funds will help absorb increased costs from inflation and pay raises.

MECHANICS

Chairman ELLENDER. Of the total requested for research for fiscal year 1973, $8.6 million is requested for the project entitled "Mechanics." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

BUDGET ACTIVITY: MILITARY SCIENCES

Description.—Major objective is improvement in hydrodynamic, aerodynamic and structural mechanic performance of naval ships, submarines, aircraft, missiles, underwater weapons, and shore installations. Emphasis is on speed and powering considerations, stability and control characteristics, structural efficiency and reliability, and noise problems. Such improvements are crucial to successful performance of Navy and Marine Corps systems which with increasing frequency depend on hydrodynamic and aerodynamic characteristics and on efficiencies, reliabilities and minimum weights of attendant structures. Research is done in the following areas:

Hydrodynamics: Foundational hydrodynamics; ship hydrodynamics and propulsion; cavitation and cavitation damage; underwater weapon hydrodynamics; gas lubricated bearings.

Aerodynamics: Fundamental aerodynamics; transonic flows; missile and projectile aerodynamics; and chemical kinetics.

Structural Mechanics: Structural stress and stability; dynamic response; mechanics and micromechanics of materials; fatigue, fracture and structural reliability; vulnerability mechanics; underwater structures; thermal studies; and vehicle crashworthiness; weapon effects.

Work performed by.—(Representative) Universities: California Institute of Technology, Pasadena, California; Princeton University, Princeton, New Jersey; Florida State University, Tallahassee, Florida; Virginia Polytechnic Institute, Blacksburg, Virginia; Non-Profit—Franklin Institute, Philadelphia, Pennsylvania; Battelle Memorial Institute, Columbus, Ohio; Industry—Hydronautics, Inc., Howard County, Maryland; Grumman Aerospace Corporation, Bethpage; Long Island, New York; Singer General Precision, Inc., Little Falls, New Jersey; Navy In-House—Naval Ship Research and Development Center, Carderock, Maryland; Naval Ordnance Laboratory; White Oak, Silver Spring, Maryland; Naval Research Laboratory, Washington, D.C.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1972 program.—Efforts involve experimental observations in turbulent and turbulent boundary flows using laser doppler velocimeters; [deleted] a three-pronged attack on transonic aerodynamic problems—analytical, numerical, and experimental; submarine structural research on shock and blast effects, sound radiation and static stress; new techniques for non-destructive testing of structural materials; studies of motions of large floating breakwaters; effects of polar environment on ocean structures; investigations of unsteady lift on propulsor and control surfaces and noise radiated from turbulent boundary layers; high speed water entry including cavitation bubble effects; shock alleviation techniques for models of various configurations; optimization of high-lift multielement airfoils; effect of ship motions on sonar performance, on all-weather aircraft carrier landing systems and on the operational capability of logistics support ships.

Fiscal year 1973 planned program.—Hydrodynamics. Derivation of numerical methods and their application to problems in hydrodynamics will be pursued. Turbulence in hydrodynamic flows will be investigated analytically, experimentally and numerically. Fundamental studies will be conducted of rotating and stratified fluids simulating geophysical phenomena in the atmosphere and

the ocean. [Deleted.] Prediction and control of trajectory of underwater weapons will be studied with particular attention to the water entry phase. Forces associated with supercavitating foils and propellers will be assayed with special emphasis on problem of designing supercavitating propellers.

Aerodynamics: Major focus for research will be on research in transonic flow problems (analytically, experimentally and numerically). A wind tunnel wall correction will be developed to convert wind tunnel measurements to values corresponding to the infinite fluid domain case. That is, to a case in which the aerodynamic characteristics are not distorted by the presence of wind tunnel walls. With decoy applications in mind, total drag and shock shape for a variety of configurations will be determined in aerodynamic range tests at high Mach numbers and low Reynolds numbers where strong boundary layer interaction conditions will be encountered. Analyses will be conducted on multi-element airfoils to determine significant parameters in high lift systems. Toward design optimization, boundary layer control through suction and blowing will be investigated analytically.

Structural Mechanics: Increased emphasis will be on shock-structure interactions such as occur in the case of underwater explosions, including the related problem of sound radiation from vibrating structures which also couples the elasticity of the structure with the fluid dynamics. Relatively new program will be expanded in vehicle crashworthiness for improving the structural design of vehicles, such as aircraft, to minimize personal injury in non-catastrophic accidents. For application of ultrasonic technology to non-destructive detection of flaws, flaw analysis studies will seek to establish a correlation between the frequencies of ultrasound attenuation and fracture strength. A computer program will be developed to assess relative effectiveness of body armor, basic physical information on the response of ocean structural materials and components to mechanical and electrochemical mechanisms of the ocean environment that degrade them will be obtained. The effect of adhesive properties on the strength and stability of bonded sandwich structures will be investigated. Techniques for estimating structural reliability from multivariate fatigue data will be developed. Laser weapons will be developed.

Resources (In thousands of dollars):

R.D.T. & EN. funds for fiscal year 1971, 7,898; fiscal year 1972, 8,463; fiscal year 1973, 8,619; additional funds to completion are continuing; and the total estimated cost is not available.

MECHANICS

Chairman ELLENDER. I note in the descriptive summary that a number of agencies of the Federal Government, including the Navy, are conducting complementary research in such areas as hydrodynamics, aerodynamics, and structural mechanics. How is this research coordinated so that duplication is avoided?

Admiral HOLMQUIST. In the area of research in mechanics there are several formal channels for coordination and information exchange. One example is the annual R.D.T. & E. apportionment review conducted by the Office of the Director of Defense Research and Engineering in which plans, programs and accomplishments are discussed by program managers from each of the three services. Another example is the quarterly progress meetings of the gas-lubricated bearings coordinated group, organized by the Office of Naval Research, with participation which includes all branches of the service, National Space and Aeronautics Administration, Atomic Energy Commission and the Maritime Administration.

Coordination activity in mechanics is also accomplished on an informal basis through continuing contracts between program managers in the Navy and their counterparts in other Federal agencies. In addition, scientific interchanges are effected on a broad scale at meetings of technical and professional societies.

Senator YOUNG. What is the need for the $156,000 increase you are requesting for fiscal year 1973?

Admiral HOLMQUIST. The requested increase for the mechanics program in fiscal year 1973 will provide nominally for added costs from inflation and pay increases.

ENERGY CONVERSION

Chairman ELLENDER. For fiscal year 1973, you are requesting $5.7 million for the project entitled "Energy Conversion." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Research

Title: Research

Subelement: 24 - Energy Conversion

Budget Activity: 1 - Military Sciences

DESCRIPTION: Objective is establishment of scientific and engineering principles to improve capabilities of Navy and Marine Corps in propulsion of vehicles (surface, subsurface, aircraft, and missiles); for improved armaments (guns, warheads, pyrotechnic devices); and for power sources for above and fixed installations (mines, buoys, remote bases, and deep-submergence systems).

Broad in scope, the related programs include research efforts in selected aspects of chemistry, physics, fluid dynamics, and structural mechanics, subdivided into the three major areas of:

Electrical Power Generation which concerns physical (primarily plasma) and electrochemical processes by which potential energy can be converted to electricity without use of rotating machinery.

Principles of Chemical Propulsion and Armaments involves the chemistry and fluid dynamic aspects of chemical propulsion systems and armaments, including energy storage, new compounds, and energy release processes.

Energy Utilization relating particularly to the interactions of chemical and physical processes as they combine to limit performance of engineering components of power and propulsion systems. Work in this area extends the basic research conducted primarily under the second area to interactions influencing components and system design.

WORK PERFORMED BY: (Representative) Universities - Purdue University, Lafayette, Indiana; Princeton University, Princeton, New Jersey; Case-Western Reserve, Cleveland, Ohio; University of Tennessee, Knoxville, Tennessee; Georgia Institute of Technology, Atlanta, Georgia, and University of Idaho, Moscow, Idaho; Non-Profit - Stanford Research Institute, Palo Alto, California; Illinois Institute of Technology Research Institute, Chicago, Illinois; Industry - General Electric, Schenectady, New York; North American Rockwell, Canoga Park, California; Fluorochem, Pasadena, California; General Telephone and Electronics, Bayside, New York; AeroChem Research, Princeton, New Jersey; Allegheny Ballistics Laboratory, Rocket Center, West Virginia; In-House - Naval Research Laboratory, Washington, D. C.; Naval Weapons Center, China Lake, California; Mare Island Naval Shipyard, Vallejo, California; U. S. Naval Postgraduate School, Monterey, California; Naval Ordnance Laboratory, White Oak, Silver Spring, Maryland.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM:

FY 1972 Program: Research is focused on the generation of electricity to determine the limitations on efficiency of a given system. Some increase in effort is placed on closed cycle nonequilibrium magnetohydrodynamics to capitalize on recent advances for better defining its capabilities. A joint AEC-ONR effort is underway on thermionics emphasizing the surface physics problems leading to a better model of surface ionization.

Research in energy storage is oriented toward obtaining new higher valence interhalogens, new ionic structures, and high temperature explosives. Jet fuel research will better define liquid phase oxidation and fuel flammability. Study of detailed kinetics of propulsion related reactions, especially those related to flame ionization processes, solid propellant and supersonic combustion, and ignition and sensitivity problems, will continue to contribute to the advancement of chemical propulsion. Emphasis has been initiated toward air-breathing subsonic and supersonic combustion. Metal combustion studies are being maintained and will influence propellant selection. Work in fluid flow problems, especially, turbulent reactive mixing, turbulent flow in turbomachinery, and techniques for measuring flow and compositional variations, leads to improved modeling needed for developmental programs, and research on dynamic seals benefits exploratory development on marine power and propulsion.

FY 1973 Planned Program: The plasma energy conversion program in thermionics will further decline centering its remaining efforts on surface physics problems. Work on Brayton cycle nonequilibrium magnetohydrodynamics will emphasize optimization of geometric and electrode design to maximize power output. Continued growth is planned for efforts in nuclear fusion, leading to understanding of fusion temperature plasmas. In electrochemical power sources, more effort will be placed on high-power density systems based on nonaqueous and solid ionic conducting electrolytes.

Energy storage research will emphasize new approaches to new energetic structures and attempt to realize theoretically predicted new compounds. Studies related to pollution and shipboard hazards of energetic materials will receive some emphasis. A further decrease is indicated for studies related to radar interference.

Efforts in behavior of single ingredients under solid propellant combustion conditions will shift to the utilization of these results to a more definitive model of solid propellant combustion. Work on metal combustion will emphasize multiparticle rather than single particle systems.

Relative to dynamic machinery, the work on dynamic seals will shift emphasis to wear problems, decreasing studies on seal lubrication analytic models. The heat transfer program will emphasize development of analytical techniques and instrumentation. Liquid metal magnetohydrodynamics will be expanded to accelerate answers to critical problems. Work on electrical machinery will be extended to include special problems associated with superconducting magnets in this technology.

RESOURCES: ($ in Thousands)	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	5,298	5,676	5,706	Continuing	NA

ENERGY CONVERSION

Chairman ELLENDER. Can you give us some idea of how this $5.7 million will be divided between Navy in-house facilities, educational institutions, non-profit organizations, and industrial organizations?

Admiral HOLMQUIST. Yes, sir. Although some shifting in the program is to be anticipated for fiscal year 1973, the $5.7 million is expected to be divided approximately the same as for fiscal year 1972. That is, for Navy in-house facilities, $1,720,000; for educational institutions, $2,337,000; for nonprofit organizations, $228,000; and for industrial organizations, $1,415,000.

Senator YOUNG. I note in the descriptive summary that the sum provided for fiscal year 1972 was $378,000 greater than the amount provided for fiscal year 1971. For fiscal year 1973, you are requesting $30,000 more than was provided for fiscal year 1972. What does this indicate? Does it mean that your fiscal year 1973 program is functioning at roughly the same level as your program for fiscal year 1972?

Admiral HOLMQUIST. Yes, sir. Our energy conversion program for fiscal year 1973 is essentially at the same level as fiscal year 1972.

OCEANOGRAPHY

Chairman ELLENDER. $25.5 million is requested for a continuing research project entitled "Oceanography." Selected paragraphs from the descriptive summary will be included in the record at this point:

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

BUDGET ACTIVITY: MILITARY SCIENCES

Description.—Programs under this subelement provide the Navy with fundamental knowledge about ocean environment, and some specialized technologies for developing, improving and effective deployment of naval systems and tactics of naval operations. Results are particularly applicable to detection, surveillance and weapons systems dependent on underwater sound propagation, to non-acoustic surveillance techniques, to submarine operations, surface ships and amphibious operations, mine warfare, deep-sea search and rescue, and deep ocean technology.

This involves a comprehensive, theoretical, laboratory and field measurement research effort in all of the oceanographic disciplines of importance to the Navy. The work, which is conducted by academic, nonprofit and industrial contractors and by Navy laboratories, involves theory, numerical modeling, laboratory models of currents, waves, heat exchange and other oceanic processes, and field operations using fixed instrumentation, research ships, oceanographic buoys, free drop instruments and aircraft. Major areas of emphasis are as follows:

Physical Oceanography is aimed at understanding the physical processes of oceans well enough to predict aspects of the environment which affect naval operations.

Chemical Oceanography is focused on elucidating the formation and evolution of water masses and sediments for assessing the influences from man-made activities on the oceanic environment and understanding chemical processes occurring in the ocean. Chemical oceanography contributes to solving problems in non-acoustic detection and surveillance systems, corrosion and deterioration of materials in the marine environment, the monitoring, assessment, and possible control of pollutants in the sea, and effect of chemical equilibria and surface chemistry on sound absorption and non-acoustic detection systems.

Air-Sea Interaction concerns the exchange of energy and materials at the interface between atmosphere and ocean affecting Navy operations. The interchange at this boundary exerts a major influence on both media, and appears to be the key element in long-range prediction of both ocean and atmospheric weather. These studies are critical to the successful development of forecasting techniques and models for ASW operations, ship routing electromagnetic detection, and to

support other Navy operations including submarine, amphibious, and air warfare.

The Marine Geology and Geophysics program is concerned with the shape, composition and properties of the earth beneath the sea and the processes that have produced the observed features and properties. The thrust of the program focuses on processes which change the sea floor, properties of the earth beneath the oceans which affect naval activities, methods of measuring and estimating these properties, in places which have not been, or cannot be measured. From the ASW viewpoint, bottom geometry and sediment structure determine possible acoustic propagation paths on a large-scale; whereas, on small-scale, those same characteristics affect coustic reflectivity, scattering, absorption, and distortion of reflected sound signals.

Oceanic Biology expands Navy's basic knowledge about the impact which biotic segments of oceans have upon operating environment. The program seeks to acquire sufficient knowledge of those natural systems affecting naval operations and planning to permit control or evasion of unfavorable systems or to exploit those natural systems exhibiting properties or attributes which may be beneficial to the Navy through technological emulation or improvisation.

Oceanic Acoustics encompasses theoretical and experimental work on the generation, transmission, reception, and interpretation of acoustic and mechanical wave information. Measurements are designed to increase comprehension of interactions between ocean and atmospheric acoustics and ocean physical phenomena, to improve knowledge of interactions of airborne and underwater acoustic waves with other physical phenomena, to investigate scale heat flow between atmosphere and ocean through corporation between acoustic wave speed and temperature of propagating medium, and to improve underwater acoustic communication.

Ocean Science Engineering research investigations include feasibility studies for in-situ measurement of acoustic properties in deep ocean cores; definition of technology gaps affecting Arctic Ocean scientific research; experimental tests and analyses of dynamic response of very long cables in the ocean; and investigation of specific technological areas concerned with improving the safety, maneuverability, and efficiency of underwater vehicles.

Work performed by.—(Representative) Academic: Scripps Institution of Oceanography, La Jolla, California; Woods Hole Oceanographic Institution, Woods Hole, Massachusetts; Oregon State University, Corvallis, Oregon; Univerity of Washington, Seattle, Washington; University of Hawaii, Honolulu, Hawaii; Texas A&M University, College Station, Texas; University of Rhode Island, Kingston, Rhode Island; University of Miami, Miami, Florida; Nova University, Dania, Florida; Massachusetts Institute of Technology, Cambridge, Massachusetts; University of Alaska, College, Alaska; Johns Hopkins University, Baltimore, Maryland; New York University, New York, New York; Non-Profit—Lerner-Marine Laboratory, Bimini, Bahamas, Batelle Memorial Institute, Columbus, Ohio; Industry—Convair/General Dynamics, San Diego, California; Westinghouse Electric Corporation, Washington, D.C.; In-House—Naval Research Laboratory, Washington, D.C.; Naval Undersea R&D Center, San Diego, California; Naval Postgraduate School, Monterey, California; Other—National Academy of Sciences, Washington, D.C.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Techniques developed for ocean floor research have been integrated into a major ocean floor investigation system aboard the USNS MIZAR. This ship has been involved in numerous search and recovery missions, including location and photography of the USS THRESHER in the Atlantic (1964); search and recovery of H-Bomb off Palomares, Spain (1966); location and photographing of the USS SCORPION in the Atlantic (1968); recovery of R/V ALVIN in the Atlantic (1969); location and photographing of French submarine EURYDICE in the Mediterranean (1970); and location and photographing of hulk of scuttled munitions ship BRIGGS (1970).

Recent data from Lamont-Doherty Geological Observatory indicate that anomalous acoustic wave velocities are associated with very gassey sediments. Laboratory experiments were initiated to test the hypothesis that the anamolous behavior was due to the presence of gas hydrates in the marine environment. Preliminary results indicate that hydrate formation in saturated sediments can increase acoustic velocity by as much as 45%. Implications for bottom-reflected sonar systems are of major significance.

Naval Research Laboratory (NRL) chemical oceanographers provided expert testimony at Congressional hearings and in court concerning the Navy's plans to dispose of chemical munitions in the Atlantic by scuttling the BRIGGS. Shipboard use of the fluoride ion electrode technique provided Navy with the capability for monitoring the environment at the site of the scuttling to determine leakage. This capability has been of major significance in aiding the DOD maintenance of a logical and rational position in regard to protection of the environment in this difficult area.

Major advances have been made in the reliability and utility of unattended ocean data gathering systems in the past few years. The General Dynamics-developed "Monster Buoy" has now remained on station in the North Pacific for a period of roughly one year, transmitting data daily by radio to a shore position 2,500 miles away. A group at Woods Hole Oceanographic Institution has demonstrated a capability to install and recover internally-recording data systems in the Atlantic with very high reliability (over 90% of instruments implanted are recovered with useful data). The technologies involved are being transferred to other groups, notably the National Data Buoy Program of the National Oceanic and Atmospheric Administration.

Fiscal year 1972 program.—[Deleted] preparing for delivery, on lease, of two new 300 gross ton research vessels to academic institutions in support of the fundamental oceanographic research effort of the Navy. These are fully equipped research vessels designed to provide platform capabilities comparable with larger vessels at a fraction of the cost; using air-droppable probes to measure total current transport, from surface to bottom, in the Gulf Stream and in the Sargasso Sea.

Fiscal year 1973 planned program.—The physical oceanography program is at a critical point relative to evolution of environmental prediction models. A major change in direction of the program will commence in FY 72. For the first time, considerable effort will be expended to test the numerical prediction models through carefully designed field experiments. This will bring together for the first time field programs involving advection and wave phenomena with theoretical and numerical circulation studies. An example is the joint Office of Naval Research/National Science Foundation International Decade of Oceanography (IDOE) program to be called Mid-Ocean Dynamics Experiment I (MODE I).

There will be a decreased emphasis on organic chemical oceanography and the use of chemical tracers for water mass movements. Effort will increase for studies on effects of temperature, pressure, and salinity on marine chemical equilibria from which thermodynamic properties of sea water will be derived. An evaluation of the use of mono-molecular (thin) films as sea markers using visual and radar surveillance techniques will be conducted.

Success of the North Pacific Study indicates that improvement in quality of the ocean data, plus better understanding of basic physical processes, could lead to climatological prediction models for both the ocean and atmosphere that would be of tactical and strategic importance to the Navy. On this basis the scientific program associated with the North Pacific Study will be accelerated.

Continue towards completion of the historical reconstruction of the movement and origin of the oceanic crust. This study is based largely on underway shipboard magnetic measurements.

[Deleted.]

A concept of oceanic regions for which acoustic volume reverberation levels can be predicted has reached the point where a vigorous research and development effort must be initiated to clarify the mechanisms of the biological system involved; the range of frequencies affected; and the limits of precision for which the concept is useful. The field/laboratory effort to make significant progress on these questions will result in a major shift in emphasis in FY 73.

[Deleted.]

Ocean science engineering problem areas in Arctic Ocean scientific operations (determined in an FY 72 working group report) will be assigned priorities and new efforts will be initiated to resolve selected problems.

Research into the development of a quality assurance program for oceanic research equipment and research into oceanographic moorings and components for use in high current regimes where high failure rates exist in present designs.

Resources (in thousands of dollars):

R.D.T. & E., N. funds for fiscal year 1971, 24,068; fiscal year 1972, 25,303; fiscal year 1973, 25,549; additional funds to completion are continuing; and total estimated cost is not available.

Chairman ELLENDER. Would you provide for the record a tabulation showing the other requests for funds for ocean science and technology in the Navy's budget for fiscal year 1973, and the amounts provided for fiscal years 1971–72?

Admiral HOLMQUIST. I will be glad to do so.

(The information follows:)

NAVAL OCEANOGRAPHY PROGRAM—RESEARCH, DEVELOPMENT, TEST AND EVALUATION, NAVY

[In thousands of dollars]

	Fiscal year—		
	1971	1972	1973
Ocean sciences:			
Research:			
Oceanography subelement	24,068	25,303	25,549
Terrestrial sciences subelement	4,256	4,826	4,740
Biological and medical sciences	30	36	37
Subtotal, research	28,354	30,165	30,326
Exploratory development	19,740	20,687	22,207
Advanced development	10,400	13,726	13,878
Subtotal, ocean sciences	58,494	64,578	66,411
Ocean engineering:			
Exploratory development	9,106	9,407	10,039
Advanced development	16,671	17,743	17,126
Management and support	409		
Operational development	1,264	969	415
Subtotal, ocean engineering	27,450	28,119	27,580
Total, oceanography program	85,944	92,697	93,991

Chairman ELLENDER. How is the $25.5 million you are requesting for fiscal year 1973 allocated among educational and nonprofit institutions, industrial organizations, Navy in-house facilities, and other Government agencies?

Admiral HOLMQUIST. Our tentative plans for allocation of the $25.5 million requested for fiscal year 1973 are as follows: Educational and nonprofit institutions, $19.4 million; industrial organization, $1 million; Navy in-house facilities, $4.7 million; and other Government agencies, $0.1 million.

Senator YOUNG. I note in the descriptive summary that the senior level coordinating group for the Navy oceanography program and other Government agencies is the Interagency Council on Marine Sciences and Engineering of the Federal Council on Science and Technology. What is the membership of this group?

Admiral HOLMQUIST. May I submit this list of the membership for the record.

(The information follows:)

Chairman, Dr. Robert M. White, NOAA.
Executive Secretary, Commander Richard E. Alderman (Acting), NOAA.

MEMBERS AND AGENCY

Mr. David H. Wallace, Commerce.
Major General F. P. Koisch, Corps of Engineers.
The Honorable Robert A. Frosch, Navy.
Dr. Roger O. Egeberg, Health, Education and Welfare.

The Honorable W. T. Pecora, Interior.
The Honorable D. L. McKernan, State.
Admiral Chester R. Bender, Coast Guard.
Dr. Spofford G. English, AEC.
Dr. Stanley M. Greenfield, EPA.
Mr. Leonard Jaffe, NASA.
Dr. Thomas B. Owen, National Science Foundation.
Dr. David Challionor, Smithsonian.

Chairman ELLENDER. Does the Navy contribute funds to efforts in the field of oceanography in other agencies of the Federal Government?

Admiral HOLMQUIST. The Navy does not contribute funds to directly support efforts of other agencies of the Federal Government in oceanography; however, we do jointly support a number of oceanographic research programs with other agencies, and in some cases, transfer funds as a matter of administrative convenience. We carefully monitor these programs to insure that each agency is providing funds for that part which is directly related to that agency's mission. In addition to these joint programs, we do directly transfer funds to other Government agencies as reimbursements for direct services rendered (specifically, the National Oceanographic Data Center and the National Oceanographic Instrumentation Center).

Chairman ELLENDER. Do other agencies of the Federal Government contribute funds to the Navy's oceanography program?

Admiral HOLMQUIST. Funds are not normally transferred from other Federal agencies to the Navy for direct support of the Navy's oceanographic research efforts, but funds are transferred to Navy for administrative convenience in support of joint programs, and as reimbursements for direct services rendered in support of the other agency's program.

Senator YOUNG. In the description of the oceanography program for fiscal year 1971, I note that the Naval Research Laboratory testified on several occasions on the disposition of chemical munitions in the Atlantic by scuttling the ship *Briggs*. Has the Navy monitored this scuttled vessel in the years since 1971, and if so, has there been any evidence of leakage of the chemical substances with which the *Briggs* was filled?

Admiral HOLMQUIST. In a series of surveys that were scheduled for the *Briggs* site, the first was carried out October 5–16, 1970, the second on June 19–22, 1971, and the third has been scheduled for May 1972. No evidence of any leakage of the material was found during either of the first two surveys.

Chairman ELLENDER. In the descriptive summary, I note that, in fiscal year 1972, the Navy planned to lease two new 300-gross ton research vessels to educational institutions. Were these two vessels in fact delivered, and if so, to what institutions and what are they being used for?

Admiral HOLMQUIST. Problems in obtaining adequate bids have delayed this effort. It is currently expected that two 300-gross-ton AGOR's will be under contract in June of 1972, with delivery expected in the summer or fall of calendar 1973. Current plans call for these ships to be leased to the University of Hawaii and Texas A. & M. University. These ships will be used in the conduct of federally supported oceanographic research and development.

Chairman ELLENDER. Tell briefly what your major efforts for fiscal year 1973 will entail.

Admiral HOLMQUIST. The major fiscal year 1973 efforts will be focused as follows:

A major expansion of a multidiscipline program in the North Pacific Ocean (NORPAX). This effort will be jointly supported with the National Science Foundation, and it is expected that other Federal agencies, particularly NOAA, will join with us in this effort. The goals are to carry out investigations in specific oceanographic phenomena which based on empirical evidence, exert a significant influence over continental U.S. weather. [Deleted.]

Continuation of other programs in ocean chemistry, oceanic biology, underwater acoustics, and other research areas pertinent to the improvement of future naval capability.

Senator YOUNG. I note in the descriptive summary that priority is being assigned to solution of ocean science engineering problems in the Arctic Ocean scientific operations. What are the major problems on which you will be working, and how much of the $25.5 million you are requesting for fiscal year 1973 will be devoted to this effort?

Admiral HOLMQUIST. In fiscal year 1972, we conducted a series of symposia and studies to identify problem areas, place them in priority, and suggest solution methods. In the coming year, we propose to spend about $100,000 to get things started in this area. Later, money from other programs will be diverted to support the work initiated by this item. Some of the critical technological areas are: methods of determining ice thickness and roughness, more economical navigation methods, under ice diving equipments, and unique arctic transportation problems.

Chairman ELLENDER. Why do you need the increase of $246,000 you are requesting for fiscal year 1973?

Admiral HOLMQUIST. The $246,000 increase will be used to augment the arctic technology effort, and to partially offset increased salary and other costs in the remainder of this program. It is to be noted that, based on inflation history of the past few years, the net result is a decreased program effort.

TERRESTRIAL SCIENCES

Chairman ELLENDER. $5.4 million is requested for the continuing research project entitled "Terrestrial sciences." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

TERRESTRIAL SCIENCES

Description.—This research derives new and comprehensive knowledge of environments in which the Navy and Marine Corps must operate. Of particular concern are new approaches to measuring, predicting and modifying the environment to minimize effects upon operational planning (ASW, Mine Warfare, Amphibious Operations, etc.), and naval communications and to optimize selection of weapons systems. Principal fields of research are:

Earth Physics involving studies of seismic, electric, electromagnetic, geomagnetic, gravimetric and thermal characteristics of the earth's crust as potential aids for crustal communications, geophysical surveillance and navigation, earth and ocean tide prediction studies for advancements in navigational and amphibious operational planning in shallow coastal waters. Geography related to pre-

diction of coastal and deltaic processes and environments for amphibious and mine warfare operations; improved coastal environmental sensing by remote means; improved methods for rapid environmental predictions. Arctic Research concerning acoustic and biologic properties of Arctic waters for submarine communications, navigation, surveillance and target analysis; sea ice studies for ice thickness measurements for predicting ice movements, locations for surfacing of submarines, and sub-ice submarine surveillance and navigation; ionospheric studies for naval radio-wave communication and long-range climatic forecasting. Environmental Factors pertinent to predicting effects of [deleted]. Military Environments providing systematic classification and quantification of specific aspects of naval warfare environments so that appropriate weapons systems may be selected and designed to optimize operational planning.

Work performed by.—(Representative) Academic—Coastal Studies Institute, Louisiana State University, Baton Rouge, Louisiana; University of Alaska, College, Alaska; University of Washington, Seattle, Washington; University of California, Berkeley, Los Angeles, Riverside, San Diego, California; Stanford University, Stanford, California; Northwestern University, Evanston, Illinois; University of Texas, Austin, Texas; Columbia University, Palisades, New York; Pennsylvania State University, University Park, Pennsylvania; University of Wisconsin, Madison, Milwaukee, Wisconsin; Yale University, New Haven, Connecticut; Harvard University, Cambridge, Massachusetts; Princeton University, Princeton, New Jersey; Michigan State University, East Lansing, Michigan; Oregon State University, Corvallis, Oregon; University of Massachusetts, Amherst, Massachusetts; Florida Atlantic University, Boca Raton, Florida; University of Chicago, Chicago, Illinois; University of Delaware, Newark, Delaware; University of Illinois, Chicago, Illinois; University of Southern California, Los Angeles, California; Non-Profit—Southwest Research Institute, San Antonio, Texas; Industrial—Aerojet General, El Monte, California; North American Rockwell, Downey, California; Arctic Institute of North America, Washington, D.C.; International Telephone and Telegraph, Hyattsville, Maryland; Lockheed Missiles & Space Company, Palo Alto, California; Tetra Tech, Inc., Pasadena, California; URS Research Corporation, San Mateo, California; Underwater Systems, Inc., Silver Spring, Maryland; In-House—Naval Weapons Center, China Lake, California, and Naval Research Laboratory, Washington, D.C.

[Deleted.]

Fiscal year 1972 program.—The Earth Physics Program focuses on the internal environment of the solid earth for data essential to new operating techniques in communication, navigation, command and control, earthquake prediction and data gathering techniques for improved operational capabilities in fleet ballistic missiles, satellite navigation, and anti-submarine warfare. Solid earth geophysical means are being emphasized toward increased accuracy in tidal prediction for coastal areas. Substantial effort is being directed to evolving remote sensing techniques for defining properties of the sea floor. Geography research programs are emphasizing coastal energy regimes to improve our environmental prediction capability, and terrain quantification techniques for expediting operational site selection for amphibious and helicopter operations in the coastal zone. Sampling methodology for coastal environments is being undertaken to facilitate correlation and categorization of remote sensors and other data systems, including testing feasibility of lasers to acquire coastal data and monitor coastal areas in comparison with microwave and other sensors. The geographic data management research includes specific emphasis on environmental map or other display techniques to assist Navy/Marine Corps aviators to maintain geographic orientation on low altitude, high-speed aircraft flights. In the Arctic program, emphasis is placed on electromagnetic and acoustic detection and communication research, under, through, and over the ice, and on modeling and predicting oceanic and atmospheric circulation and radiation balance. Particular effort is given to improved understanding of sea ice physics, dynamics and thickness measurement techniques. An extensive pilot field project, Arctic Ice Dynamics Joint Experiment (AIDJEX), is being initiated. The Environment Factors program has a major effort on effects of [deleted]. Further research is being supported to assist the SSPO (Strategic Systems Project Office) in obtaining quick reaction solutions to operational test flights.

Fiscal 1973 planned program.—The Earth Physics Program will emphasize studies of the internal environment of the Solid Earth to expand its support of geophysical techniques for predicting tides in open ocean and coastal areas worldwide, and for developing techniques to reduce hazards to Naval installations from impact of tsunami and earthquake effects.

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The Geography Programs plan to strengthen integration of coastal dynamics investigations and test of remote sensing systems, and to emphasize identification of principal environmental elements that govern coastal behavior as a guide to uses of remote sensors and to the development of coastal data management systems. Included is the search for more effective means of acquiring, interpreting, managing and displaying coastal information, especially in support of advanced concepts of amphibious and helicopter operations and low-altitude, high speed aircraft flight.

In the Arctic Program, emphasis will be placed on electromagnetic and acoustic detection and communication research, under, through, and over ice, on modeling and predicting oceanic and atmospheric circulation and radiation balance and an improved understanding of sea ice physics, sea ice dyamics and sea ice thickness measurement techniques.

The Environmental Factors Program plans include participation in ranging [deleted].

Resources: R.D.T. & E., N. funds for fiscal year 1971, $4,788,000; fiscal year 1972, $5,424,000; fiscal year 1973, $5,378,000; additional funds to completion are continuing; and the total estimated cost is not available.

TERRESTRIAL SCIENCES

Senator YOUNG. I note in the descriptive summary that a number of other agencies of the Federal Government are engaged in activities related to the Navy's efforts in terrestrial sciences. Would you please elaborate on the statement that coordination is maintained between the Navy and these other agencies through "personal contacts, formal and informal committees".

Admiral HOLMQUIST. Coordination by ONR scientists with such agencies as National Science Foundation, National Aeronautics and Space Agency, Departments of the Army and Air Force, Advanced Research Projects Agency, et cetera, are maintained by close working contact with, and knowledge of, the programs of these agencies. ONR scientists and/or program managers are in almost daily contact (by telephone and meetings) with some of these other Federal agencies. Also, interagency groups such as the Interagency Arctic Research Coordination Committee (IARC) assure coordination of the program ONR terrestrial scientists and/or program managers also sponsor or attend a great number of professional society meetings and workshops each year at which parts of the programs and activities of both ONR and these other agencies are discussed. We thus feel confident that a very thorough coordination is maintained.

Chairman ELLENDER. Would you provide a tabulation for the record showing the contributions by other Government agencies for projects under the Navy's terrestrial sciences program, listing the agencies, the projects to which they are contributing, the sums contributed for fiscal years 1971 and 1972 and the estimates for fiscal year 1973?

Admiral HOLMQUIST. I will be glad to do so.

(The information follows:)

[Dollars in thousands]

Agency	Terrestrial sciences project	Fiscal year— 1971	1972	1973
Advanced Research Projects Agency	Natural and induced physical phenomena.[1]	$567	$1,015	$1,000
	Earth physics		68	750
	Arctic research	870	254	190
	Geography	110		
U.S. Air Force	Natural and induced physical phenomena.[1]	100	95	100
U.S. Army	do		5	
U.S. Coast Guard	Geography	8		
Commerce Department	do	15	23	20
Defense Nuclear Agency	Natural and induced physical phenomena.[1]	25	50	50
U.S. Geological Survey	Geography		2	
National Aeronautics and Space Administration.	Arctic research			80
National Oceanic and Atmospheric Administration.	do		78	40
National Science Foundation	do		250	200
Total		1,695	1,840	2,430

[1] Formerly environmental factors.

Chairman ELLENDER. How is the $5.4 million you are requesting allocated between educational institutions, nonprofit organizations, industrial organizations, and Navy in-house facilities?

Admiral HOLMQUIST. Distribution of funding in fiscal year 1973 is planned as follows: Educational institutions, $4,346,000; nonprofit organizations, $273,000; industrial organizations, $548,000; and Navy in-house facilities, $211,000.

Chairman ELLENDER. It would appear that your program in terrestrial sciences is being carried out in fiscal year 1973 at roughly the same level as in fiscal year 1972. Am I correct about this?

Admiral HOLMQUIST. Yes, sir; that is correct.

ATMOSPHERIC SCIENCES

Chairman ELLENDER. Of the total requested for research, $2.7 million is for the project entitled "Atmospheric sciences." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

ATMOSPHERIC SCIENCES

Description. This research provides the Navy and Marine Corps with the scientific basis in atmospheric sciences necessary to improve our ability to forecast weather for naval operations by conventional means and by use of solar-terrestrial relationships; performance of Navy systems for communications, surveillance, night vision and optical viewing; reliability, efficiency and safety of naval flight operations; and to extend to the individual ship at sea a greater ability to remotely sense its operating environment.

Research supported concerns cloud nucleation and circulation pertinent to cloud modification and weather forecasting, particularly at sea; lightning spectroscopy and photometry, and simulation of the lightning stroke and its physical properties with emphasis on decreasing hazards to aircraft and problems of flight safety, discrimination between man-made and natural events and communications interference; instrumentation applicable to altitudes above those of the standard radiosonde for physical properties and composition of the atmosphere that affect high altitude flight; absorption, scattering, and propagation of visible and infra-

red radiation in the atmosphere; studies of atmospheric electricity; investigation of solar emissions, particularly, in the extreme ultraviolet and soft x-ray regions which are the predominant emissions influencing the terrestrial atmosphere; studies of ion composition of the lower atmosphere and ionosphere and of the relationship of this composition to solar emissions and to ionospheric phenomena affecting communications and to the conduction of the electric current of the atmosphere; and use of low-light-level television to study auroral and meteor phenomena in the ionosphere.

Work performed by: (Representative) Academic—University of Arizona, Tucson, Arizona; University of California (Berkeley), Berkeley, California; New Mexico Institute of Mining & Technology, Socorro, New Mexico; University of Minnesota, Duluth, Minnesota; State University of New York at Albany, Albany, New York; Non-Profit—Cornell Aeronautical Laboratory, Buffalo, New York; Stanford Research Institute, Menlo Park, California; Industrial—Panametrics, Waltham, Massachusetts; Westinghouse, Pittsburgh, Pennsylvania; In-House—Naval Research Laboratory, Washington, D.C.

Fiscal year 1972 program.—Current year research involves the use of a unique FM radar, incorporating both a scanning and Doppler capability, to study wave induced turbulence. In aeronomy, efforts are directed to exploiting a finding from the 13 October 1969 launch of various optical equipment which revealed helium-2 as a significant component of the earth's high atmosphere and a source of the radiation which maintains elevated levels of ionization in the ionosphere. Helium-2 will be considered particularly from the standpoint of studying the morphology of the earth's plasmapause under the impact of solar events. Research programs are being pursued for obtaining scientific information critical to improving methods of observation and forecast for oceanic atmosphere under and in which the Navy operates. Other research efforts during the current year pretain to a broad span of atmospheric problems which affect naval operations.

Fiscal year 1973 planned program.—Improve the remote sensing ability for the ship at sea divorced from the large observation networks over land.

Accumulate engineering data for improved design of electronic equipment sensitive to effects of atmospheric electricity, both induced and direct. The problem poses special difficulties for maritime clouds.

Provide better information on special aspects of tropical meteorological and hydrological forecasting important to naval amphibious operations.

Develop techniques for elucidation of the meteorological variables in the upper atmosphere in relation to the emerging generation of higher performance aircraft.

Make upper atmospheric determinations of water vapor and ozone, maintaining the continuity of northern hemisphere data as determined from a single mid-latitude location. In the recent discussion about the SST, these Naval Research Laboratory data were practically the only material available for estimating the ecological effects of high flying aircraft.

Seek better determinants for the impact of solar events on the earth's atmosphere as they affect naval communications and terrestrial weather.

In cooperation with National Aeronautics and Space Administration, satellite experiments (SESP 72–1) will be launched to obtain global maps [deleted].

Resources (In thousands of dollars):

R.D.T. & E. funds for fiscal year 1971, 2,767; fiscal year 1972, 2,650; fiscal year 1973, 2,694; additional funds to completion are continuing; and the total estimated cost is not available.

Atmospheric Sciences

Chairman Ellender. I note in the descriptive summary that the Office of Naval Research cooperates with several other agencies of the Federal Government in research programs. Would you please tell us what agencies are involved, the research programs involved, and what form this cooperation takes. Is there any exchange of funds?

Admiral Holmquist. The Department of Transportation (DOT) and NASA cooperate with ONR in the latter's atmospheric sciences research program. Both DOT and the Navy are interested in the impact of high-altitude air operations on the stratospheric environment. The Office of Naval Research has a balloon capability for conducting

observations in the stratosphere, and DOT is providing funds to support some of the measurements made by such balloon flights. Items measured include water vapor, ozone, and dust. The balloon network includes both the Arctic and the Antarctic. These observations have been underway since December of 1971. The purpose of these observations is to provide baseline values of stratospheric conditions for evaluation of the climatic impact of air operations on the stratospheric environment. Included in the program is the observation of stratospheric dust by means of special instrumentation on an Air Force satellite. The total of funds transferred from DOT to ONR to date for this work is $1,050,000.

Additionally, there is a transfer of $25,000 from NASA to ONR for the installation of a lightning detection and location system that was developed on an ONR contract with the Universiy of Arizona. Both NASA and the Navy are interested in the effect of lightning upon: (1) Rocket and/or missile launch operations, and (2) electronic and computer equipment in aircraft and spacecraft.

Senator YOUNG. How is the work performed under atmospheric sciences allocated among educational institutions, nonprofit institutions, and industrial organizations, and Navy in-house facilities?

Admiral HOLMQUIST. Funds for atmospheric sciences in fiscal year 1973 are planned for distribution as follows: Educational institutions, $671,000; nonprofit, $126,000; industrial, $207,000; and Navy in-house, $1,686,000.

Chairman ELLENDER. It would appear that the work being performed under this project in fiscal year 1973 is at roughly the same level as in fiscal year 1972. Am I correct?

Admiral HOLMQHIST. Yes, sir. That is correct.

ASTRONOMY AND ASTROPHYSICS

Chairman ELLENDER. For fiscal year 1973, $2.5 million is requested for a project entitled "Astronomy and Astrophysics." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

ASTRONOMY AND ASTROPHYSICS

Description.—Research involves the collection, analyses, and interpretation of astronomical data related to the Navy's operational environment. Involving research in the new astronomies, i.e., gamma-ray, x-ray, ultraviolet, infrared, and radio astronomy, the related investigations provide immediately useful data and systems to meet naval requirements for improvements in communications, navigation, guidance, search and tracking, geodetic grids, precise-time transfer, long-range weather forecasting, and military surveillance systems of the future in these new regions of the spectrum.

Astronomical x-ray sources, unknown a decade ago, are now commonplace. The background of x-rays at energies greater than 10 Kev is greater than from the quiet sun and must be considered in design of any exoatmospheric military system. X-rays control the ionosphere and affect radio frequency propagation.

Gamma-ray astronomy is conducted using newly devised telescopes flown from balloons but capable of utilization either on Apollo-type orbiting telescopes or on the moon. This research enhances the most advanced technologies in plasma physics and weapons research.

[Deleted.]

Infrared astronomy employs cryogenically cooled telescopes and detectors to cover the spectral region between visible light and radio waves. [Deleted.]

Radio astronomy is the only one of the new astronomies which can be conducted using ground based equipment. Radio-telescopes are used singly and in widely spaced combinations for long baseline interferometry to identify and determine the characteristics of different types of extraterrestrial radio sources; and to determine limitations imposed by propagation through space and the earth's atmosphere. New scientific knowledge is obtained on the physical processes and composition of the universe, and new concepts and technology are developed for utilization in programs of Navy interest. This technology has great potential for providing precise time transfer, improved navigation, precise geodetic grids, and improved remote sensing and surveillance.

Work performed by.—Naval Research Laboratory, Washington, D.C.

Fiscal year 1972 program.—X-ray observations to determine effects of natural high energy processes on communications are being conducted.

Gamma-ray observations are being conducted (also concerned with their effects on communications and manned space flight) from balloons carrying the recently developed gamma-ray telescope.

[Deleted.]

Infrared work is proceeding [deleted].

Emphasis is directed on radio frequency (microwave) efforts as concerns navigation and communication. This will include VLBI (very-long baseline interferometry).

Fiscal year 1973 planned program.—X-ray Astronomy: Continuation of the sky survey program using larger rockets and detectors. Development of the Super Chief sounding rocket using surplus Sergeant motors.

X-ray spectra of solar flares will continue to be monitored.

Gamma-ray Astronomy: From balloons carrying the recently developed gamma-ray telescope, seek to detect and measure the gamma radiation from the galactic center.

Study the spectrum of atmospheric gamma radiation generated by collisions of cosmic-ray nuclei.

Improve gamma-ray observations.

[Deleted.]

Radio Astronomy: More sensitive and higher accuracy very long baseline interferometer measurements of water molecule sources to investigate source position variability, weaker sources; and accuracy limitations.

Investigate potential measurement accuracies in determination of positions on earth and time transfer by very long baseline interferometry.

Investigate solar magnetic fields in small diameter active radio source regions by high resolution radio polarimetry.

Resources (In thousands of dollars:)

R.D.T. & E., N. funds for fiscal year 1971, 2,463; fiscal year 1972, 2,476; fiscal year 1973. 2,465; additional funds to completion are continuing; and the total estimated cost is not available.

Astronomy and Astrophysics

Chairman Ellender. I note in the descriptive summary that the work performed in astronomy and astrophysics has been in large measure a joint NASA/Navy effort. Could you give us an idea of how this effort has been managed, that is, which agency has had supervisory responsibility for the programs involved, how has the funding been divided, and what steps have been taken to avoid duplication of effort?

Admiral Holmquist. The Navy's astronomy and astrophysics program is primarily conducted by the Naval Research Laboratory. However, certain astronomical and astrophysical data required by the Navy is obtainable only through experiments aboard extraterrestrial vehicles. As an economical and practical means for conducting such experiments, the Navy participates jointly with NASA. In these instances, the Navy submits a detailed proposal to NASA requesting integration of the experiment in a NASA flight. Based on findings of its scientific panel reviews, NASA supports those experiments having

the most promise for contributing to its purposes. The Navy maintains scientific supervision of its own experiments within the constraints peculiar to the total flight exercise. The close and continuous coordination between NASA and Navy scientific and management personnel for each of these experiments assures that there is no duplication of NASA and Navy scientific programs.

Senator YOUNG. Is the $2.5 million requested for astronomy and astrophysics all for the Naval Research Laboratory?

Admiral HOLMQUIST. Yes, sir. The total $2.5 million requested is for the Naval Research Laboratory.

Chairman ELLENDER. The total requested for fiscal year 1973 is slightly less than the amount provided for fiscal year 1972. What has caused this decrease in your budget for funds for astronomy and astrophysics?

Admiral HOLMQUIST. The decrease of $11,000 from the previous year will maintain essentially a level of effort program in this area for this year. This figure reflects a minor adjustment made after careful review of the funding requirement for the total Navy research program.

BIOLOGICAL AND MEDICAL SCIENCES

Chairman ELLENDER. Of the total requested for research, $10.8 million is for a project entitled "Biological and medical sciences." Selected paragraphs from the descriptive summary will be incuded in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

BIOLOGICAL AND MEDICAL SCIENCES

Description.—The objective is to maintain and restore the health of Navy and Marine Corps personnel in environments peculiar to naval operations. Three general aims of the research program are to define the environmental parameters within which personnel can efficiently perform their duties, to improve methods of diagnosis, treatment and prevention of disease and injury, including combat injuries, and to utilize biological principles to improve sea and amphibious operations. Environmental stress factors being investigated include: pressure (decreased, at altitude, and increased, under sea), force fields (acceleration and deceleration, including impact), temperature (both high and low ambient temperatures), ionizing radiation, non-ionizing radiation (including radar, lasers, very low frequency and extremely low frequency electromagnetic fields), toxic atmospheres or materials, isolation and fatigue. These stress factors may be encountered in swimming or diving in the sea; as crew member in a submarine or surface vessel; in flight in a helicopter or fixed-wing aircraft, especially in aircraft carrier operations; and in amphibious operations in any climate including tropical and polar. Research is conducted on means of improving prevention and control of certain specific diseases of particular naval importance. Respiratory diseases, for example, are an important cause of time lost from training of recruits. Protection against diseases indigenous to the Middle and Far East may be of critical importance to naval and Marine Corps operations. Research is conducted on such items as methods of freezing blood for use as a supplement to ordinary blood-bank blood; preserving and transplanting tissue, such as skin, dura, tendon, fascia and bone, for treatment of combat wounded; and understanding the underlying mechanisms in traumatic shock.

Work performed by.—(Representative) Academic—University of California, Berkeley, California; University of North Dakota, Grand Forks, North Dakota; University of Pennsylvania, Philadelphia, Pennsylvania; Cornell University, Ithaca, New York; Harvard University, Cambridge, Massachusetts; Brown University, Providence, Rhode Island; State University of New York at Buffalo,

Buffalo, New York. In-House—Naval Undersea Research and Development Center, San Diego, California; Naval Civil Engineering Laboratory, Port Hueneme, California; Naval Medical Research Institute, Bethesda, Maryland; and Naval Submarine Medical Laboratory, Groton, Connecticut; Naval Biomedical Laboratory, Oakland, California.

Fiscal year 1972 program.—Research in physiology focuses on effects of hostile environments on Navy and Marine Corps personnel, determination of physiological limitations to human capabilities in these environments and development of methods to circumvent these limitations. Environmental stresses include hot and cold climates, high and low pressures, electromagnetic radiation, fatigue noise vibration, isolation and combat. Physiology of deep diving is an important part of this program. Research being done in the general area of surgical repair is essential to the preservation and sterilization of tissues, the development of new materials and the immunology of graft rejection and tolerance. Research in microbiology concerns the disease state in man under abnormal conditions, including infections suffered by divers and swimmers. Development of new or improved vaccines against all serotypes of meningococcal meningitis, gonorrhea and syphilis receive high priority. Biochemistry research generates basic knowledge of life processes needed in dealing with the problems created by the physiological and mental stresses in naval operations. Biological solutions are being sought to naval problems of pollution abatement and control, material preservation and fouling. Clinical medical research includes work in dental research, impact acceleration injury and medical problems in amphibious operations.

Fiscal year 1973 planned program.—There will be a continued high level of support for research related to saturation diving problems. Emphasis during FY 1973 will shift to problems related to very deep diving; i.e., to depths greater than the 850–1,000-foot continental shelf.

Since new types of microwave and other electromagnetic frequency communication systems are being developed and installed by the Navy, more scientific information relative to the biomedical effects of electromagnetic radiation in the microwave, high frequency, very low frequency and extremely low frequency regions must be obtained.

Future efforts in psychophysiology will be concentrated on determining extent and limitations of self-regulation of human automatic responses; the behavioral correlates of visual and auditory evoked cortical potentials and other electrical phenomena of the brain will be studied, especially as they relate to performance enhancement.

Initiate research into the biochemical changes which are clinically described as addiction to drugs. The profound effects of drug withdrawal imply the existence of such changes, and understanding of what they are would seem to be a logical first step both preventing and treating addiction.

Survey the state of knowledge in toxinology. This is a required first step toward meaningful coordination of the efforts in venom research in order to identify the major problems which need solving and which are approachable with current biochemical arts.

Research on bone marrow transplantation and the development of a rapid, accurate system of tissue typing will be emphasized in the transplantation field.

Increased emphasis will be placed on improved vaccine development against the epidemic and venereal diseases prevalent in the Navy; determination of microbiological control methods for breaking the life cycle of disease transmitting agents (e.g., mosquitos, ticks, lice, mites); improve our knowledge of the ecology of diseases (vectors, modes of transmission, reservoirs) in foreign countries that may affect Navy personnel.

Efforts will be made to isolate petroleum degrading organisms from the polar regions of the Mideast. Attempts will be made to develop strains of organisms capable of degrading petroleum products at low temperatures. An evaluation will be made to determine if any potential hazard exists to marine life from petroleum degradation products.

In the blood preservation program, effort will continue on the identification of clinically acceptable cryoprotective agents to simplify methods for freezing of blood for long term storage. Problems concerned with the treatment of traumatic shock in combat wounded personnel necessitate increased emphasis on studies in peripheral microcirculation and on the relationship between resuscitation by replacement of body fluids and subsequent development of lung complications. Research on the repair of injuries will concentrate on clinical problems of nerve graft and management of large facial bone defects.

An important cause for loss of life and property in Southeast Asian operations is helicopter and carrier aviation accidents. Injury to the head, neck and spine account for a significant number of these losses. The present efforts related to protective devices and procedures show possible reductions of such losses by a significant amount. Acceleration of this effort is necessary to provide research information in a timely manner to a technology for the saving of lives and expensive flight equipment.

Resources (In thousands of dollars:)

R.D.T. & E., N. funds for fiscal year 1971, 9,198; fiscal year 1972, 10,502; fiscal year 1973, 10,796; additional funds to completion are continuing; and the total estimated cost is not available.

BIOLOGICAL AND MEDICAL SCIENCES

Senator YOUNG. As I remember, last year you told us that some of the work done on this project was being performed by a Navy medical research unit in Cairo, Egypt. Do we still have any research units in Egypt?

Admiral HOLMQUIST. Yes, sir. The Naval Medical Research Unit No. 3 in Cairo, Egypt, continues to work on prevalent diseases of Africa and the Middle East which are of operational significance to the Navy and Marine Corps.

Chairman ELLENDER. I note in the descriptive summary that work on the project is closely related to work being performed by several other Government agencies, and that these efforts are coordinated by several different committees. Presumably these committees have many other projects to oversee also, and I wonder if it is really possible for them to coordinate efforts between the Navy and other Government agencies in this one project well enough to prevent duplication of effort. Would you please comment on this?

Admiral HOLMQUIST. The Navy does not intentionally duplicate research being done elsewhere. The Navy utilizes all sources of information in obtaining solutions to its problems. When the results of previous or on-going work do not satisfy the Navy need, work is initiated under the Navy program. Duplication is prevented by extensive screening of on-going and proposed effort by scientists at the working level and by management at laboratory command, Navy Department, and Department of Defense levels.

The Navy's program is coordinated with other health research programs through the following mechanisms:

Director Defense Research and Engineering
- Joint Medical Research Conference
- Technology Coordinating Paper

Defense Committee on Research—Biological and Medical Sciences subcommittee

Department of Defense Armed Forces Epidemiological Board

Department of Defense Armed Forces Pest Control Board

Department of Defense—National Aeronautics and Space Administration
- Aeronautics and Astronautics Coordinating Board—subpanel on Life Sciences
- (Interagency life sciences supporting space research and technology exchange)

National Academy of Sciences/National Research Council
- Medical Sciences Division—(Committees and Subcommittees)
  - Committee on Naval Medical Research

National Science Foundation (Committee)—International Biological Program
National Institutes of Health (study sections)
President's Science Advisory Committee—Office of Science and Technology
National Council for Marine Sciences—National Commission on Marine Science, Engineering and Resources

Some of these committees are general in nature and review the broad aspects of the program and some of the committees cover specific scientific areas. The committee approach achieves adequate coordination by insuring that the individual laboratory worker interfaces with his counterpart in other agencies.

Senator YOUNG. How is the work on biological and medical sciences allocated among educational and nonprofit institutions and Navy inhouse facilities?

Admiral HOLMQUIST. The work on the biological and medical sciences program is conducted approximately 50 percent inhouse, 40 percent on contract in educational institutions and 10 percent in nonprofit institutions.

Senator YOUNG. Why isn't it possible for the Navy to perform all of the work on this project in Navy inhouse facilities?

Admiral HOLMQUIST. It is not possible for the entire program to be conducted in-house because there are certain highly specialized scientists or unique equipment available for utilization under contract which are not available inhouse. It is not necessarily desirable to develop an inhouse capability to solve problems in every specialized area or where problems may be nonrecurring. Use of a contract may make available to the Navy very specialized individuals on an interim or ad hoc basis. The interplay of the inhouse and contract efforts is conducive to the highest quality of research.

Chairman ELLENDER. Describe one or two of the major programs to be pursued in fiscal year 1973.

Admiral HOLMQUIST. Some of the major programs to be pursued in fiscal year 1973 are: The depth to which a deep sea diver may dive and the length of time he may remain on the bottom performing useful work for search, rescue, recovery of objects, salvage or exploration is limited by lack of information of a physiological nature on the effects of high pressure on the diver. This lack of information exists on such factors as the fundamental cause of oxygen poisoning, the role of inert gases used in breathing mixtures, and physiological effects of pressure per se on living processes.

Marine Corps personnel must be prepared to proceed at any time to any portion of the world as directed in the interests of the United States. In the performance of such duty, personnel would come in contact with the health hazards occurring in the particular area. Many of the more serious diseases of tropical and semitropical areas either do not exist in this country or are not of significance here due to advanced public health conditions. In fiscal year 1973 emphasis will be placed on debilitating parasitic diseases such as schistosomiasis and viral diseases of particular prevalence in the Middle East and Southeastern Pacific areas.

Chairman ELLENDER. Tell us why you need the increase of $294,000 you are requesting for fiscal year 1973.

Admiral HOLMQUIST. The increase of $294,000 is needed in fiscal year 1973 for additional research on the physiology of deep diving and the epidemiology of diseases of naval importance in tropical and subtropical areas. Research utilizing high pressure facilities is more expensive because of equipment costs. Research in diseases of naval importance which do not occur in this country is being increased.

BEHAVIORAL AND SOCIAL SCIENCES

Chairman ELLENDER. $3.5 million is requested for the project entitled "Behavioral and social sciences." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Research

Title: Research

Subelement: 42 - Behavioral and Social Sciences

Budget Activity: 1 - Military Sciences

DESCRIPTION: Behavioral and Social Sciences encompasses research necessary for treating factors which limit full utilization of Navy and Marine Corps personnel. Knowledge and techniques generated are expected to improve the capabilities of the Navy and Marine Corps to select, train, and organize men to function effectively in their operating environments and also to maximize their effectiveness by contributing to improvements in equipment design and job design.

Major areas of emphasis are: Selection and Retention, which is concerned with selection, classification and assignment of Navy personnel and the factors which affect or influence career motivation and personnel retention; Job Design and Performance aimed at discovering or developing improved methods of job evaluation, job classification, job analysis, job design, and performance evaluation; Learning and Training, which encompasses human learning processes and their relationship to training and education of Navy and Marine Corps personnel; Organizational Effectiveness for determining psycho-social factors (such as morale, motivation, type of leadership, and interpersonal communication) that contribute to effective organizational functioning; and Engineering Psychology, for determining and assessing perceptual-motor and cognitive performance capabilities of man as an active component in naval systems, and deriving new man-machine principles and techniques for improving system design.

WORK PERFORMED BY: (Representative) Academic - Harvard University, Cambridge, Massachusetts; University of Southern California, Los Angeles, California; University of Florida, Gainesville, Florida; Stanford University, Stanford, California; Industrial - Westinghouse Electric Corporation, Waltham, Massachusetts; Human Factors Research, Inc., Santa Barbara, California; Non-Profit - Oregon Research Institute, Eugene, Oregon; Stanford Research Institute, Palo Alto, California; In-House - Navy Neuropsychiatric Research Unit, San Diego, California; Naval Submarine Medical Center, New London, Connecticut; Naval Personnel and Training Research Laboratory, San Diego, California; Naval Missile Center, Point Mugu, California.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM:

FY 1972 Program. Research programs for the current year provide primary emphasis on human visual and auditory sensory capabilities and limitations especially as they relate to performance in Anti-Submarine Warfare systems and underwater (hyperbaric environment). Other areas receiving emphasis concern biochemical and electrophysiological factors as they relate to behavior in normal and stressful situations, identification of new dimensions of human intelligence, aptitudes and personality, focusing on the acquistion of information to serve as a basis for deriving new training and testing techniques for use in force reduction, selection and retention, and rapid mobilization; job evaluation and job design methodology dealing particularly with the concepts of signal detection theory applicable to evaluating on-the-job performance of Anti-Submarine Warfare operators under various operating conditions, with special attention to individual alertness; computer assisted instruction in which the computer generates what is presented to the student on the basis of interactive dialogue thus affording maximum diagnostic and remedial sequencing; leadership and morale in unusually stressful environments, in isolated and confined settings similar to TEKTITE II, in novel weapons systems, under conditions of extreme heat or cold, and in panic-provoking situations; systematic compilation of human per-

formance data in underwater environment to reflect divers' work performance levels, and for optimizing design of underwater tools, equipment and operational systems.

FY 1973 Planned Program: Selection and Assignment: Efforts in the personnel-selection domain will concentrate on the question of whether a computer can effectively be programmed to adapt test questions, on line, to suit the abilities and needs of individual Navy men. The potential of this computer-based testing for reducing inadvertent cultural bias will be investigated. With a volunteer military force in prospect, research on personnel retention will take into account the impact of changing military requirements and changing social pressures on Navy enlistment, retention, and career motivation patterns.

Job Design and Performance Evaluation: Greater emphasis will be placed on research aimed at improving operational billet-evaluation techniques. New on-the-job proficiency tests and better measures of performance will be sought. These will serve as bases for the evaluation of new predictor tests and new methods.

Learning and Training: Research on techniques for providing "hands-on" training (for skills such as electronic maintenance) under computer management will be intensified. Research on computer-based shipboard training systems will be directed to questions such as the most appropriate kind of personnel to train, and critical areas which promise maximum pay-off to the Navy.

Organizational Effectiveness: Increased effort will be directed toward producing information and techniques to assist the commanders of field units with their "people" problems. Conventional human resources research concentrated on support of headquarters operation (recruiting, assignment, formal school training, etc.), but has largely neglected the needs of the commanding officer who must cope with difficult problems in dealing with his own men. In recognition of this, the Bureau of Naval Personnel is endeavoring to find solutions to several important "people" problems; e.g., drug abuse, cross-cultural communication, minority relations, and inter-group communications (up and down the chain of command). The use of various training techniques, generally called "human relations training" for such people problems is growing in the Navy. A critical methodological need is for techniques to assess the impact of such training.

Engineering Psychology: Efforts will focus on developing quantitative relationships describing human visual and auditory signal detection, information processing and decision making under normal and unusual environmental conditions typical of those experienced in Navy operational systems.

Expanded attention will be devoted to (a) human performance as affected by design of software and equipments used in computer-based information processing systems; (b) interactive methods and graphic displays in command/control systems; (c) control system dynamics and man-machine interface design in control of manipulators and remotely piloted vehicles.

RESOURCES: ($ in Thousands)	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	3,654	3,516	3,518	Continuing	NA

BEHAVIORAL AND SOCIAL SCIENCES

Chairman ELLENDER. I note in the descriptive summary that one of the major projects in fiscal year 1973 in behavioral and social sciences is to be research on retention of personnel. How is this research accomplished, and what period of time do you think will be necessary in order to evaluate the effectiveness of the research?

Admiral HOLMQUIST. Research into the retention of personnel is accomplished under contract with educational institutions, nonprofit firms, and industry. The objectives of such research are to determine those factors which significantly influence a serviceman's decision to reenlist, and to suggest techniques for encouraging qualified individuals to make the Navy or Marine Corps a career. In light of the planned elimination of the draft, the personnel-retention research assumes even greater importance. The research is continuously monitored, evaluated, and funded on a year-by-year basis. Decisions regarding its continuation are made in terms of its productivity and relevance. Work in this area will continue for some time, because the topic is critically important to the Naval Establishment. Short-term research is conducted in parallel to the longer range efforts. Appropriate offices within the Navy and Marine Corps are promptly informed of research findings and recommendations so that they may take the necessary action for implementation.

Senator YOUNG. It would appear from the descriptive summary that this program will be continued at approximately the 1972 level. Is this correct?

Admiral HOLMQUIST. Yes, sir; that is correct.

STUDIES AND ANALYSIS SUPPORT, MARINE CORPS

Chairman ELLENDER. For fiscal year 1973, $2.4 million is requested for the program element entitled "Studies and analysis support, Marine Corps." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Studies and Analysis Support, Marine Corps

Category: Management and Support

Budget Activity: 1-Military Sciences

DESCRIPTION: Marine Corps funding requirements for Studies and Analyses reflect the need for technical and technological expertise and for operations analysis capabilities which are not available in sufficient depth or on a timely basis within the Marine Corps. Rapid advances in technology and continually rising costs have in the last decade made it essential that studies and analyses be conducted not only to determine requirements for weapons systems and to develop new concepts but also to provide the basis for decisions which exploit new technology on a controlled and cost effective basis. This Program Element provides for studies and analyses, to be conducted by external research organizations, which will evaluate the manpower and personnel needs; preferred concepts, policies, techniques, methods and systems, and their respective costs for employment of land, sea, and air forces in potential or actual conflict; determine and apply improved logistics methods for procurement, inventory control, storage, distribution, transportation, maintenance and disposal of military material; determine preferred mixes of forces to meet existing and potential threats; establish requirements for weapons systems or other military material, or compare the effectiveness and costs of alternatively constituted and equipped forces. It also provides for further development and application of methods for the rapid application and exploitation of new findings in science and technology. These studies will be utilized to confirm, refine or revise planning objectives in the mid and long range period.

WORK PERFORMED BY: Naval Research Laboratory, Washington, D. C.; Naval Weapons Laboratory, Danlgren, Va.; Naval Ship Research and Development Center, Carderock, Md.; Stanford Research Institute, Menlo Park, Calif.; Marine Corps Development and Education Command, Quantico, Va.; Martin-Marietta Corp., Orlando, Fla.; Radio Corporation of America, Camden, N.J.; Litton Systems, Woodland Hills, Calif.; Bunker-Ramo Corp., Silver Springs, Md.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program:

a. The studies described in paragraph 1, subparagraphs e. through l. were continued into FY 1972 and a portion of the funds in this program element were committed to these ongoing efforts.

b. New major studies which have been or will be initiated in FY 1972 include:

(1) Tactical Doctrine for Seabased Amphibious Operations - To develop tactical doctrine for seabased amphibious operations and to prepare an appropriate instructional precis. The ongoing Seaborne Mobile Logistic System (SMLS) study will provide the logistic portion.

(2) Marine Air Ground Task Force (MAGTF) Lift Requirements and Logistic Planning Factors Model - To develop a computer-assisted model capable of producing embarkation and resupply lift requirements for any given Marine Corps landing force, to compute lift requirements for selected MAGTFs and to provide a means of producing and maintaining current a document containing all pertinent logistic planning factors used in the model.

(3) Tactical Combat Operations (TCO) System - To develop a baseline Technical System Model (TSM) for the Tactical Combat Operations System of the Marine Tactical Command/Control System (MTACCS) concept.

(4) Mobile, Protected Weapons System - To determine the needs for such a system in the long range period, the functions to be performed and capabilities to be provided, and constraints on development, acquisition and utilization of such a system.

(5) Engineer Support for the Fleet Marine Force (FMF) in the Midrange - To define an engineer support concept, force structure and equipment requirements for the midrange period.

(6) Combat Service Support Command and Control System - To determine the requirements for and scope of the Marine Integrated Logistics System (MILOGS) of the Marine Tactical Command and Control System (MTACCS) concept and to develop and analyze alternative descriptions of the system required.

(7) Infantry Organization and Weapons - To determine by study and limited field experiment and troop test the most combat effective organization and weapons package for the Marine infantry battalion elements, battalion and regiment for the period 1973-1977.

(8) Marine Corps Signal Intelligence (SIGINT) Organization and Equipment - To identify necessary changes in the organization and concepts of employment of the Fleet Marine Force (FMF) radio battalions.

(9) Application of Innovative Training Support Systems - To determine innovative training support systems requirements/pilot program applications.

FY 1973 Planned Program:

a. The following studies previously described will be continued into FY 1973:
   (1) Joint Navy/Marine Corps Seaborne Mobile Logistics System (SMLS).
   (2) Operational Introduction and Evaluation of the AV-8A Harrier Aircraft.
   (3) Tactical Doctrine for Seabased Amphibious Operations.
   (4) Tactical Combat Operations (TCO) System.
   (5) Combat Service Support Command and Control System.
   (6) Infantry Organization and Weapons.
   (7) Application of Innovative Training Support Systems.

b. The following additional studies are planned for initiation in FY 1973:
   (1) Fire Support in the Long Range Period - To determine fire support systems requirements for the long range period (1985-1994).
   (2) The FMF Ammunition Management System (1975-1984) - To develop an ammunition management system, to include a control and distribution system and organizational and equipment requirements.
   (3) Tactical Mobility in the Long Range Period - To determine tactical mobility requirements and systems mix for the long range period (1980-1990).
   (4) Common Air/Ground Logistic Support (1975-1984) - To identify commonality in air/ground logistic support functions and requirements.

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(5) Installation and Facilities Requirements in the Long Range Time Frame - To determine the requirements for installations and facilities, to include training areas and forward deployment bases, to support the Marine Corps long range operational and logistic concepts.

(6) Medical and Dental Support System (1984-1993) - To describe the long range medical and dental support system, to include resources and organizations required.

(7) Ships and Materials Handling Equipment Compatibility with V/STOL Aircraft (1980-1990) - To determine landing force requirements for shipboard systems related to loading and offloading troops, equipment and supplies and for landing force materials handling equipment which will operate in conjunction with V/STOL transport aircraft and high speed surface amphibians of the period.

(8) Logistic Support for Air Deployed Marine Air Ground Task Force (MAGTF) 1975-1984 - To determine concepts and requirements for logistic support for an air deployed MAGTF.

c. Work on ongoing studies must be continued in FY 1973 to attain the objectives originally established for those studies. New studies proposed for FY 1973 are high priority studies. The need for the results of these studies for planning and decision making purposes dictate that they be undertaken in FY 1973.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	1942	2200	2350	Continuing	NA

STUDIES AND ANALYSIS SUPPORT, MARINE CORPS

Chairman ELLENDER. Would you tell us the nature of the various studies to be performed under this program element?

General BROOKS. Yes, sir. Studies and analyses funded under this program element will address requirements for weapons systems and equipment; will develop or refine concepts; assess cost effectiveness of alternative systems, equipment, and organizations; and provide the basis for refinement or revision of midrange and long-range planning objectives.

Senator YOUNG. I note in the descriptive summary that these studies and analyses are to be, and I quote "conducted by external research organizations." Would you comment on the reason for this?

General BROOKS. I will be glad to. The Marine Corps policy is to perform as many of its studies and analyses in-house as possible, and all of its studies do, in fact, involve in-house effort—both in the management and conduct of each study. However, some studies require technological expertise and complex operations research techniques which are readily available in industry, but could be maintained on an in-house basis only at a prohibitive cost.

Chairman ELLENDER. How much of the $2.4 million requested for fiscal year 1973 is for studies and analyses begun in previous years, and how much is for new efforts?

General BROOKS. Sir, $1.1 million is for studies and analyses initiated in previous years, and $1.3 million for studies and analyses to be initiated in fiscal year 1973.

Senator YOUNG. It would appear from the descriptive summary that the program for fiscal year 1973 will be continued at approximately the same level as for fiscal year 1972. Am I correct about this?

General BROOKS. Yes, sir; that is correct.

Chairman ELLENDER. I note that, in fiscal year 1973, you will continue with an existing program entitled "Operational Introduction and Evaluation of the AV–8A Harrier Aircraft." Would you describe this project and tell us what the results of your studies in this area in fiscal years 1971 and 1972 have been, and what you expect to accomplish in fiscal year 1973?

General BROOKS. Yes, sir. The project is an in-house effort designed to provide for an operational appraisal and orderly introduction of a new and unique aircraft into our operating forces. The primary work is being done by the Marine Corps Development and Education Command, with analytic assistance provided by the Marine Corps Operations Analysis Group, Center for Naval Analysis. Work to date has consisted of the development of a concept of operations and employment, including support requirements; the designing of operational evaluation tests and the validation of these tests.

Operational evaluation tests are being conducted by the squadron at Beaufort, S.C., and various naval laboratories. One of the most recent of these tests was conducted in March 1972, and preliminary results indicate that the Harrier will have an effective sortie rate even higher than that originally projected. In fiscal year 1973, operational appraisal of the aircraft and concept requirements will continue, problem areas will be identified, and the concept refined.

STUDIES AND ANALYSIS SUPPORT, NAVY

Chairman ELLENDER. For fiscal year 1973, $12.5 million is requested for the continuing management and support program entitled "Studies and Analysis Support, Navy." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMAR'

Category: Management and Support

Title: Studies and Analyses Support, Navy

Budget Activity: 1 Military Sciences

DESCRIPTION: These studies provide scientific bases for major planning and policy decisions. Mathematical models, computer simulations, and detailed data analyses assist Navy decision makers to evaluate advanced systems plans, and choose between major alternatives--in weapons systems development, force levels, tactical doctrines, operating strategies, personnel, training, etc. This element, along with the related CNA (Center for Naval Analyses) work, provides for detailed critical investigations of important policy questions, and develops a basic body of data and analytical methods for investigations of future Navy problems.

There are eight separate projects funded under this element in FY 1973 covering such areas as planning, and policy, studies on force levels; strategic threats; future weapons systems needs; training, readiness, and support systems; and sea power generally; technical studies on opportunities to exploit new scientific findings; on allocation of research resources; on evaluation of alternative ways to meet long range threats; and on improved formulations of the Navy's general operational requirements and scientific needs in future research and development; advanced methods for measuring and predicting the actual performance and effectiveness of the fleet, based on statistical and computer analyses of at-sea exercise data and; planning studies in advance of future development of specific systems for such areas as aircraft, undersea warfare, and medical operations; and studies to help plan the major emphases in future Navy laboratory R&D programs.

WORK PERFORMED BY: Approximately fifty contractors, including non-profit research organizations, and about ten in-house laboratories. Contractors include the Naval Warfare Research Center of the Stanford Research Institute; Planning Research Corporation; Wagner Associates; Presearch, Incorporated; Operations Research Incorporated; General Electric-Tempo; and General Dynamics (Electric Boat). The Naval Weapons Center, China Lake; the Naval Research Laboratory in Washington, D.C.; and the Naval Electronics Laboratory Center, San Diego, are typical laboratory participants.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program: Effort will continue with work on studies such as:
Advanced attack aircraft carrier
Attack/fighter candidates for the Sea Control Ship
Defining new system requirements for future Research and Development
Command and Control Tactical Analysis studies for fleet and task forces
Examination of category reduction techniques and procedures
Strategic Communications
Sea Control Forces and Mix

Analysis of Command and Control Problems
Naval use of large Surface Effect Ships

FY 1973 Planned Program: Continued effort on ongoing studies plus new starts such as:
Carrier Vulnerability Study
ASW and ASW force level planning
Improved measures of effectiveness
Review of planning methods

This element will continue toward its general objectives with effort directed as necessary to focus attention on those areas where the greatest benefits are anticipated.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	9,240	9,240	12,455	Continuing	NA

STUDIES AND ANALYSIS SUPPORT, NAVY

Chairman ELLENDER. Would you provide for the record a listing of the studies and analyses to be funded under this program, the amounts for fiscal years 1971 and 1972, and the estimate for fiscal year 1973?

Admiral HOLMQUIST. I will be glad to do so.

(The information follows:)

DEPARTMENT OF THE NAVY

SUMMARY OF STUDIES AND ANALYSES--NAVY
APPROPRIATION "RESEARCH, DEVELOPMENT, TEST AND EVALUATION, NAVY"
SUMMARY BY STUDY
(In thousands of dollars)

Study	Fiscal year-- 1971	1972	1973
STUDY CATEGORY 2, CONCEPTS AND PLANS			
Project No. RF 018-05:			
Navy Submarine Launched Ballistic Missile Defense	235	-	-
Mine Warfare Analyses	10	-	-
Mobile Repair Facility	33	-	-
Sea Based Cruise Missile	14	-	-
Nuclear Attack Submarine	22	-	-
ASW Ordnance Inventory Objective	29	-	-
Naval Communications Long Range Study	28	-	-
Sea Control Ship	87	-	-
CV Concept	30	-	-
Ship Supply Support	75	-	-
Destroyer Assessment	25	-	-
SSN Mission Analysis	18	-	-
Naval Aviation Safety	60	-	-
Support to Naval Forces	58	30	-
Fire Support Requirements for Amphibious Operations	142	141	-
Joint Navy/Marine Corps Amphibious Forces	212	127	-
Strategic Systems Evaluation	67	81	-
Tactical Air Armament	367	220	-
Tactical Electromagnetic Systems	150	150	-
Navy Fighter III	105	208	-
Air Launched Missile Ordnance Inventory Requirements	20	30	-
Sea Control Forces and Mix	33	67	-
Strategic Communications	-	150	-
SSBN Operating Policy	-	60	-
Feasible ICBM Operations	-	50	-
Capability of Minuteman III Command Data Buffer Systems	-	40	-
Future Maritime Strategy	-	200	-
ASW Capabilities of Aircraft Carriers	-	100	-
CAPTOR Deployment	-	150	-
Position Determination	-	60	-
Development of Conceptual Analysis Capabilities	-	30	-
Sea Control Forces	-	98	-
Cost Estimating Relationships	-	76	-

Study	Fiscal year-- 1971	1972	1973
Project No. RF 018-05--Continued			
Wide Aperture Sonar Analysis	-	32	-
Sea Control	-	-	650
Projection of Seapower	-	-	500
Mobility and Support	-	-	100
Manpower and Reserves	-	-	150
Force Readiness	-	-	50
Strategic Systems	-	-	250
Procurement and Cost Analysis for Systems Development	-	-	100
Mid Range and Long Range Objectives	-	-	150
Support for PPB Process	-	-	150
Project No. RF 018-90:			
Tactical Unit Capabilities	-	-	920
Force Requirements and Capabilities	-	-	390
Fleet Readiness Analysis	-	-	570
Study Coordination and Control	-	-	100
Parametric Cost Analyses	-	-	970
Technical Review	-	-	250
Total, study category 2, concepts and plans	1,820	2,100	5,300
STUDY CATEGORY 3, OPERATIONS AND FORCE STUDIES			
Project No. WF 018-05:			
Strategic Analysis Investigations	550	-	-
War Gaming Techniques and Methodologies	725	-	-
Project No. MF 018-02:			
Programwide Analysis	-	10	15
Project No. WF 018-02:			
Strategic Analysis Investigations	75	-	-
Total, study category 3, operations and force studies	1,350	10	15
STUDY CATEGORY 5, SCIENCE AND TECHNOLOGY			
Project No. RF 018-02:			
Operational Applications of Game Theoretic Models	119	-	-
Evaluation of Ship Weapons Installation	85	-	-
Automatic Tract Reconstruction for Mobile Navy Units	5	-	-
Mechanical Failure Research Correlation	13	-	-
Floating RF Antenna Array	21	-	-
Committee on Undersea Warfare	95	-	-
Acoustic Countermeasures for Carrier Task Force Defense in the Objective Area	84	-	-
Container Utilization Benefit Analyses	72	-	-
Deceptive Maneuvering in Task Force Operations	83	-	-
Effectiveness of Towed Passive Sonars	75	-	-
Integrated ACM/ECM Defense Techniques against Submarine-Launched Cruise Missiles	85	76	-

Study	Fiscal year-- 1971	1972	1973
Project No. RF 018-02--Continued			
Implications of the Combination of Holography and Computers for Naval Applications	50	50	-
Effectiveness Measures in Mine Warfare	40	40	-
Naval Applications of Low Temperature Physics Technology	64	11	-
Roles and Missions of an Advanced Attack Submarine	44	20	-
Naval Communications Long-Range Study	125	33	-
External Mounting of Submarine Electronics	29	68	-
Evaluation and Performance Analysis of Liquid Metal Magnetohydodynamic (MHD) Power Systems	116	35	-
Command Control and Communications Analyses	-	-	290
Towed Array Tactical Analyses	-	183	135
Systems Analyses--Force/Fleet Level	-	-	315
Systems Analyses--Task Group Level	-	-	340
Application of Advanced Technology	-	-	330
Analysis of GOR-37, Environmental Systems, and GOR-42, Oceanography	-	40	60
Analysis of GOR-41, Logistics, and GOR-42, Ship Support	-	80	80
Analysis of GOR-17, Surface Anti-Air Warfare, and GOR-34, Navigation	-	40	60
Analysis of GOR-43, Personnel Support	-	50	50
Analysis of GOR-26, Mine Countermeasures, and GOR-38, Special Warfare	-	60	60
Analysis of GOR-24, Undersea Surveillance, and GOR-33, Electronic Warfare	80	100	100
Analysis of GOR-16, Airborne Anti-Air Warfare, GOR-21, Air ASW, and GOR-45, Aviation Support	75	100	110
Analysis of GOR-31, Command Control, GOR-32, Communications, and GOR-35, Ocean Surveillance	70	80	80
Analysis of GOR-23, Surbmarine ASW	50	50	50
Analysis of GOR-22, Surface ASW	55	40	40
Analysis of GOR-13, Submarine Attack	35	40	40
Analysis of GOR-11, Airborne Attack, and GOR-41, Amphibious Assault	70	80	80
Analysis of GOR-15, Sea-Based Deterrance, GOR-25, Mining, and GOR-47, Ordnance Support	75	110	110
Analysis of GOR-12, Surface Attack, and GOR-48, Weapons Effect Countermeasures	70	80	80
Target Depth Determination in Antisubmarine Warfare	10	60	-
Navy Antiair Warfare System Performance Analysis	41	53	85
Evaluation of Multi-Access Discrete-Address Concepts for Navy Tactical Voice Communications	96	99	60
Evaluation of Task Force Defense Concepts	-	94	95
Representation of the Passive Sonar Classification Process	91	60	-
Improved Design and Reliability of Hull, Mechanical and Electrical Equipment	7	13	-

Study	Fiscal year-- 1971	1972	1973
Project No: RF 018-02--Continued			
Methodologies in Task Force Defense Analyses	-	95	-
Cruise Missile Submarine Information and Tactics Analyses	-	20	-
Search Director for ASW Aircraft	-	37	-
Transmission Fluctuations	-	25	-
Analytic Approaches to Navy Planning Problems	-	60	-
Measurements of Active Sonar Performance At Sea	-	50	-
Operational Effectiveness of High Speed Ship Designs	-	98	-
Navy Communications Systems Control Plan	-	6	-
ASW Escort Search Policies	-	30	-
Underwater Communications Test and Evaluation	-	25	-
External Submarine Weapon	-	46	-
Modular Submarine Analysis	-	75	-
Alternative Target Depth Determination Study	-	69	-
Total Shipboard Information Receipt, Storage, and Destruction	-	87	-
Advanced Submarine Concept Study: Energy Source, Conversion and Transmission Technologies	-	52	70
Project No. MF 018-02:			
Amphibious Medical Development Program	90	51	-
Battle Casualty Data	-	5	5
Motion Sickness	-	25	-
Dental Medicine and Logistics	-	24	30
Health Care Delivery	-	-	70
Project No. WF 018-02:			
Investigations of Naval Airborne ASW	50	55	60
Investigations of Naval Airborne Anti-Air Warfare	459	318	335
Naval Airborne Strike Warfare Investigations	130	145	145
Studies of the Effectiveness of Advanced Vehicles	75	80	85
Aircraft Utilization, Availability and Costing	130	120	120
Investigations of the Military Worth of Air Strike Supporting Systems	60	65	65
NAVAIR Systems Capabilities	55	30	30
Support for NAVAIR Concept Formulation Efforts	90	210	240
Operational Attractiveness of Dual Mode Guided Weapons	85	57	-
Simulator Validation and Simulated Combat Engagements	10	10	10
Task Force Command and Control Study	71	-	-
Naval Air Plan	20	-	-
Data Collection	45	-	-
NAVAIR Systems Capabilities	-	410	-
Support of Mathematical Analyses	-	-	50

Study	Fiscal year-- 1971	1972	1973
Project No. WF 018-02--Continued			
Investigations of Naval Airborne Anti-Air Warfare Systems	-	-	95
Investigations of Naval Airborne ASW Systems	-	-	75
Investigations of Naval Attack Aircraft Including Armament	-	-	95
Investigation of Naval Air-Launched Missile Guidance and Control	-	-	95
Project No. RF 018-96			
A Physical Approach to Dynamic Modeling of Performed Beam Systems	67	-	-
ASW Rapid Response System	38	-	-
RF Guided Ordnance	18	-	-
Search Procedures in the Presence of False Targets	71	-	-
Effects of Operational Situations on Sonar Operator Detection Performance	25	15	-
A Queuing Methodology for Analysis of ASW Operations and Assessment of Effectiveness	89	91	55
Storage, Analyses, and Retrieval of Narrative and Verbal Communications and Command Decision Information from Fleet Exercises	84	25	-
Formulation and Solution of Force Level Problems by Matrix Game Techniques	-	98	55
Fleet ASW Data Analysis Program (FADAP)	-	62	-
First Passage and Time Above Threshold Problem	10	10	-
Tactical Problems in Submarine Verses Submarine Warfare	100	100	150
AAW Target Determination in the Navy Tactical Data Systems (NTDS)	60	210	-
Mathematical Game Theory Applications in ASW Detection	-	70	-
Statistical Methods for Search for Stationary Submerged Targets	30	71	65
Destroyer Tactical Analysis	119	174	215
Weapon Effectiveness Models for Torpedo Fire Control	79	79	65
Comparative Analysis of Objective Functions and Criteria of Performance Used in Navy Systems Analysis	98	75	50
Automatic Reconstruction of AAW Tracks	52	60	-
Characterization of False Targets in ASW Mission	33	45	-
Operational Effectiveness of Bistatic Echo-Ranging in ASW	54	-	75
Methods for Obtaining and Analyzing Time-Preference Judgments in Performance, Mission and Weapons Systems Analyses	92	-	-
Impact of Dynamic Reliability on Airborne ASW Effectiveness	60	60	-
Summary of Naval Measures of Effectiveness	81	-	50
ASW Applications of Bayesian Statistics	-	13	-
Response Surface Methodology for Computer Simulation of Intelligence Situations	-	54	-

Study	Fiscal year-- 1971	1972	1973
Project No. RF 018-96--Continued			
System for Operational Data Collection from BARSTUR and Other Ranges	-	3	-
Operations Analysis for CINCLANTFLT	-	23	-
ASW Tactical Analysis Groups Summary and Evaluation	-	18	-
Analyses and Investigation of Submarine Sonar Systems	-	20	-
Configured Minefield Theory	-	34	-
Formulation of a Surveillance Analysis Plan	-	53	-
Analysis of Bias Errors in Tracking Sonars	-	6	-
Test and Evaluation of Optimization Techniques	-	40	-
Statistical Methods for Formulation of Input Data in Large Scale Simulations	-	99	-
Tactical Sequences for Fields of Mixed Sonobuoys	-	65	-
Handbook of ASW Sonar Model Parameters and Formulas	-	70	-
Analytic Methods for Navy Officer Distribution Planning	-	34	-
Mathematical Models for Carrier Landing Procedures and Training	-	63	-
Surveillance Target Motion Analysis Algorithms	-	77	125
Statistical Methods for Design and Testing of Fleet Exercise Data	-	95	45
Judgmental Inputs to ASW Information Processing and Decision Making	-	35	45
Navy Officer Distribution Simulation Techniques	-	35	45
Game Theoretic Balanced Force Requirements Analysis Methodology (BALFRAM)	-	93	60
Analyses of Sea Control Ship Functions and Tactics	-	40	30
Fire Support Methodology	-	-	205
Graphic Ranging Methods	-	-	65
Force Level Planning and Value Theory	-	-	45
Simulation of Major Fleet Exercises Using Platform Equipments	-	-	70
Evaluation and Analysis Methods for Fleet Exercise Data	-	-	125
Coordinated Task Force Operations Modeling	-	-	125
Tactical Model Development	-	-	150
Measures of Effectiveness and Objective Functions for Naval Warfare Areas	-	-	145
Project No. RF 018-97:			
Automatic Data Validation Techniques for ASW Information System	74	-	-
Improved Design and Reliability of Hull, Mechanical and Electrical Equipment	15	-	-
Committee on Undersea Warfare	25	-	-
Fleet ASW Data Analysis Program (FADAP)	249	-	-
Automatic Reconstruction of AAW Tracks	37	-	-

Study	Fiscal year-- 1971	1972	1973
Project No. RF 118-98:			
System for Operational Data Collection from BARSTUR and Other Ranges	18	-	-
Destroyer Tactical Analysis	38	-	-
Automatic Track Reconstruction for Mobile Navy Units	113	-	-
FADAP Fleet Representative for SQUEEZE PLAY	29	-	-
ASW Rapid Response System	15	-	-
Characterization of False Targets in ASW Mission	13	-	-
Analysis of Externally Mounted Weapon System Effectiveness	78	-	-
Committee on Undersea Warfare	25	-	-
Improved Design and Reliability of Hull, Mechanical and Electrical Equipment	71	-	-
Project No. RF 118-99:			
Committee on Undersea Warfare	100	150	150
Project No. ZF 018-12:			
Advanced Technical Objectives--Working Group for Amphibious-Close Support	50	55	75
Advanced Technical Objectives--Working Group for Electronic Warfare	142	65	75
Panel for Fire Research	40	10	10
Advanced Technical Objectives--Working Group for Fleet Defense	72	124	125
Advanced Technical Objectives--Working Group for Intelligence Collection and Exploitation	100	110	128
Advanced Technical Objectives--Working Group for Sea Based Deterrence	30	80	80
Advanced Technical Objectives--Working Group for Special Warfare	30	50	50
Advanced Technical Objectives--Working Group for Strike Warfare	6	-	-
Laboratory Advisory Group for Project LAWRENCE	-	46	62
Air Capable Ship Study	40	-	-
Total, study category 5, science and technology	6,070	7,130	7,140
Grand total	9,240	9,240	12,455

STUDIES AND ANALYSIS SUPPORT

Chairman ELLENDER. Of the total requested for studies and analysis support, I note that $2.7 million is for the project entitled "Technical Systems Evaluation." Please describe briefly the purpose of this study.

Admiral HOLMQUIST. This project was initiated to undertake a continuing program of operations research studies of naval requirements for, and the expected performance of, advance warfare systems. It produces scientific estimates of the expected performance, in actual fleet operations, of promising new weapons systems concepts such as advanced submarines, high-speed ships, and tactical deception with countermeasures for task force defense. The objective is to enable the Navy to anticipate new threats, develop better statements of general operational requirements, and adjust its plans to exploit new and advanced technologies. It offers scientific backup to the selection among costly and competing advanced weapons systems and new tactical concepts and operating doctrines.

Senator YOUNG. Of the total requested for Studies and Analysis Support, $120,000 is requested for a project entitled "Navy Medical Support Capability." What is the purpose of this study?

Dr. FROSCH. This project will apply study and analysis/operations research methodology to the planning of medical research, development, test, and evaluation programs. It will examine the requirement and the response thereto in the areas of (1) medical manpower, (2) medical facilities, (3) medical support operations, (4) medical logistics, and (5) medical science and technology.

Chairman ELLENDER. $1.5 million is requested for a project entitled "Navy Air Systems Capability." What is the purpose of this study?

Admiral WEYMOUTH. This project covers a number of continuing or proposed studies of airborne systems in order to assure selection of the best research and development alternatives. It encompasses a wide spectrum of problems involving operations research, systems analysis, and cost-effectiveness tradeoffs. It is principally an in-house effort with Navy laboratories such as the Naval Air Development Center and the Naval Weapons Center. Studies in fiscal year 1972, include aircraft candidates for the sea control ship, advanced air-launched missiles, bistatic techniques for airborne ASW, dual mode missile guidance, new computer models, an evaluation of enemy antiair capabilities against penetrating aircraft, and carrier aircraft systems effectiveness (CASE).

The fiscal year 1973 program will continue several of the fiscal year 1972 studies such as CASE, advanced air-launched missiles and aircraft for the sea control ship. New studies will include vulnerability of carriers as a function of gross tonnage, air-to-air radar missiles and cost, reliability, and maintainability prediction methods.

Senator YOUNG. For fiscal year 1972, $2.1 million is requested for the project entitled "Operational and Strategic Analysis." Would you give us a brief description of this project?

Admiral HOLMQUIST. Yes, sir. The project was established to provide the Chief of Naval Operations the flexibility and quick-reaction capability to perform high priority studies, most of which respond directly to OSD and JCS requirements. Specific objectives are to (*a*) produce study recommendations impacting on current important programs/issues/decisions, (*b*) contribute to strategy, tactics, and doctrine, (*c*) conduct new and existing weapons systems studies. Studies

have addressed, for example, tactical electromagnetic systems, sea control forces, strategic communications, pilot training, CAPTOR deployment, and carrier ASW effectiveness. Studies and analytic efforts supported by this project are conducted by both civilian contractors and in-house activities.

Chairman ELLENDER. $605,000 is requested for the Director of Navy Laboratories Studies and Analyses. What are these funds used for, and why do you need an increase of $65,000?

Dr. FROSCH. These funds support working groups of technical experts from the in-house laboratories who are brought together to make assessments of threats, requirements, and capabilities in designated warfare areas and to provide guidelines for future research and development. The funds are also used to assemble groups of laboratory experts representing a variety of technical disciplines to provide quick response to requirements for technical and analytical experts. The increase requested will allow an increase in effort in response to requests for laboratory support from those who have already benefited from the efforts of these groups. For example, one of the groups has been working with the Naval Scientific and Technical Intelligence Center to determine areas where the in-house laboratory expertise can aid in improving devices and techniques for the acquisition, analysis, and dissemination of intelligence information. An increase in funding will allow us to pursue more of these areas in fiscal year 1973.

Senator YOUNG. You are requesting $3.2 million for what appears to be a new project entitled "CNO Program Analysis and Evaluation." What do you hope to accomplish with this effort?

Admiral HOLMQUIST. Recent budget reductions leading to decreases in operating units and restricted procurement programs serve to reemphasize the increased requirement for thorough analyses of program alternatives (*a*) to determine appropriate tradeoffs between maintaining current capabilities and modernizing naval forces to meet the projected threat of the last seventy's and eighty's, (*b*) to identify cost effective ways to upgrade the readiness of the Reserve forces and to employ the Reserve forces to best extend the capabilities of the Active Naval forces, (*c*) to tailor support costs to combat force levels, (*d*) to allocate funds most effectively to increase force readiness, and (*e*) to refine the weapons acquisition process to increase emphasis on independent parametric cost analysis and phased test and evaluation. More intensive evaluations of feasible tradeoffs among programing alternatives is required to insure that limited funds available for naval forces are expended in a fashion to insure the most suitable force structure.

This project will provide essential assistance to the Chief of Naval Operations and the Secretary of the Navy in achieving the appropriate balance among Navy programs. The following tasks will be stressed under this project:

(*a*) Development of cost estimating relationships for each weapon systems in the development and acquisition process.

(*b*) Determination of cost-effective programs to improve and maintain required levels of fleet readiness.

(*c*) Analysis of major program issues.

(*d*) Evaluation of the cost-effectiveness of logistics and support.

(*e*) Evaluation of alternative maritime strategies.

(*f*) Assistance to the technical review of the CNO studies and analyses program.

Chairman ELLENDER. Your request includes $2.1 million for the project entitled "Methods for Analysis of Fleet Performance." Please describe this project briefly and tell us what you hope to accomplish in fiscal year 1973?

Admiral HOLMQUIST. This project, methods for analysis of fleet tactical effectiveness and performance (MAFTEP) was initiated in 1969, as a successor to the fleet ASW data analysis program which produced a standardized system for Navy-wide collection of fleet exercise data. MAFTEP was established to develop methods and models to derive quantitative scientific estimates of the current and future performance of naval forces from the standardized data system. It appears to be the major Navy effort to bring about an improvement in quality and real Navy usefulness of studies and analysis.

An objective of MAFTEP is to produce tested, standardized techniques for measuring the performance of naval platforms, personnel and tactics, and use these methods to indicate the best directions for improving performance. The scope of MAFTEP includes, for example, weapons systems choices, force level planning, manpower policies, command-control functions at all levels, reliability and maintenance policies, antiair warfare, sea control ships, antisubmarine warfare tactics, fleet exercise reconstruction algorithms, uses of human judgment data, and comparative analyses of various ways of measuring fleet effectiveness. The individual tasks under this project are done for the most part, in conjunction with fleet activities, utilizing fleet data bases. The breadth of topics undertaken and planned has widened as an increasing number of Navy officers and commands have begun to utilize the methodology developed under this program on many specific problems for which more powerful and less expensive analysis methodology seems to be desperately needed.

Tasks under this project are accomplished by a variety of research firms and nonprofit institutes, with a few participating Navy Laboratories. Coordination is achieved by advisory groups and steering panels (e.g., the advisory group on BuPers office distribution plan models), but primarily by specific fleet command participation, with analysts sometimes resident at activities such as SUBDEVGRU Two, DESDEVGRU, ASWFORLANT, and OCEANSYSLANT. Various activities have incorporated the techniques developed in their own continuing exercise and reconstruction planning, for example, the tracking aglorithms being used by the 1st Fleet in the AAW exercise reconstruction program, the search theory method being implemented by the Coast Guard search and rescue computer centers, and the use of game theoretic models to analyze joint service operations and force planning decisions at CINCPAC.

Specific plans for fiscal year 1973 involve the development of improved coordination and coupling of analytic methodologies to fleet exercises planning, reconstruction, and performance evaluation. From these efforts we anticipate obtaining improved effectiveness measures and more accurate estimates of fleet performance by better utilization of scarce at-sea time. Other program highlights for fiscal year 1973 include:

(*a*) New work on coordinated operations and command-control problems in use of surveillance systems, of submarines as escorts to task forces, and of deception devices to confuse enemy forces.

(*b*) Extensions of previous work in queuing theory and game theory to evaluate fleet tactics.

(*c*) Several tasks concerned with human judgements, treating the probabilities of false targets as hypotheses for sequential testing in modeling the tactical maneuvers observed in exercises.

(*d*) Continuing work on the mathematical and computer techniques to be used by BuPers in projecting the requirements for and distribution of naval officers to billets.

(*e*) New models for multistatic ranging—the use of several destroyers and aircraft in ASW where active and passive sonar roles are combined in sequences that make much better use of the acoustic information in a variety of environmental situations.

Chairman ELLENDER. $150,000 is being requested for the support of the National Research Council, Undersea Warfare Committee. Could you tell us what other agencies contribute to the support of this Committee and how the Navy is represented on it?

Admiral HOLMQUIST. The activities of the Committee on Undersea Warfare are supported solely by Navy funding through a contract between the National Academy of Sciences and the Office of Naval Research. No other agencies contribute to the Committee's support. The Committee, whose members serve without fee, acts as a continuing advisory group to assist the Navy in the planning and guidance of research and development. Naval personnel do participate in studies and symposia to provide the Committee with operational and technical information. The Committee responds to specific problems or areas of concern to the Navy. The most recent studies by the Committee were on the subjects of sonar information processing and display, active sonar surveillance, submarine communications and search rate, air antisubmarine warfare, and a technological assessment of future submarine characteristics.

CENTER FOR NAVAL ANALYSES, MARINE CORPS

Chairman ELLENDER. The request includes $950,000 for Marine Corps support for the Center for Naval Analyses. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

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FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Center for Naval Analyses, Marine Corps

Category: Management and Support

Budget Activity: 1-Military Sciences

DESCRIPTION: The Marine Corps has a continuing requirement for supplementary analytic support at the Headquarters Marine Corps (HQMC) and field levels for the conduct of major studies and for the conduct of short term analyses. In particular the Marine Corps requires the availability of knowledgeable and experienced analysts who can respond on short notice to high priority requirements. This program funds the Marine Corps Operations Analysis Group (MCOAG), a component of the Center for Naval Analyses of the University of Rochester. The MCOAG conducts operations research, system analyses and cost effectiveness studies, furnishes objective and timely evaluations of current Fleet Marine Force operations, exercises and deployments, and tests of weapons, tactics and equipment. A detachment of the MCOAG is located at Quantico, Virginia to support the Marine Corps Development and Education Command with operations research assistance, both in conducting studies and in evaluation of new weapons, equipment and tactics. MCOAG field representatives provide operations analysis assistance to the Fleet Marine Forces in the Atlantic and Pacific Fleets.

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WORK PERFORMED BY: Marine Corps Operations Analysis Group, Center for Naval Analyses, University of Rochester.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1971 and Prior Accomplishments:

Source Data Evaluation Study continued to examine selected automated reporting systems to determine the points at which error is introduced, the causes of the error, and recommended techniques which would reduce error.

FY 1972 Program: The Marine Corps Operations Analysis Group (MCOAG) is continuing its general analytic support in FY 1972 with emphasis on the Class V Planning Factors Study, operational concepts studies for the AV-8A Harrier aircraft, analytical programming support of Headquarters Marine Corps, and field support of the two Fleet Marine Force commanders and the Commanding General, Marine Corps Development and Education Command (MCDEC). In addition, support is being provided to a Close Air Support study being conducted by the several services and the Joint Chiefs of Staff as well as to a joint Navy/Marine Corps analysis of amphibious warfare capabilities and requirements.

FY 1973 Planned Program: The pattern of support by MCOAG reflected in prior years will continue in FY 1973. This will include continued support of the Operational Concepts of the AV-8A Harrier study and the analyses of amphibious warfare capabilities and requirements. Extensive support is planned for a study entitled Infantry Organizations and Weapon System, which will be conducted by MCDEC. This study will involve extensive troop testing and related data collection and analysis. Support will also be provided for further work in identifying sources and causes of data error in the Manpower Management System. MCOAG will also provide analytic assistance for the test bed of the Marine Integrated Fire and Air Support System (MIFASS). It will continue to provide a field detachment at MCDEC and representatives at Fleet Marine Force Atlantic and Fleet Marine Force Pacific headquarters.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	898	700	950	Continuing	NA

CENTER FOR NAVAL ANALYSES, MARINE CORPS

Senator YOUNG. I note several references in the descriptive summary to the Marine Corps operations analysis group. Just what is this group, and where is it located?

General BROOKS. Sir, the Marine Corps operations analysis group is an operating group of the Center for Naval Analyses and is located principally in Rosslyn, Va. The group maintains a detachment at the Marine Corps Development Center in Quantico, and field representatives at Fleet Marine Force, Atlantic and Pacific. The professional staff consists of civilian scientists educated and trained in a variety of disciplines such as economics, mathematics, and operations analysis. Additionally, the staff has attained extensive experience and expertise in many facets of Marine Corps organization, doctrine, concepts and operational characteristics. These qualifications make the Marine Corps operations analysis group an extremely valuable source of analytic support.

Chairman ELLENDER. Earlier, we discussed the project entitled "Operational introduction and evaluation of the AV–8A Harrier aircraft" which is funded through the studies and analysis support, Marine Corps, program element. I also note references to, and I quote, "continued support of the operational concepts of the AV–8A Harrier study" in the description of the fiscal year 1973 program for the Center for Naval Analyses, Marine Corps. What is the relationship between these two programs?

General BROOKS. Sir, as you know, the "Operational introduction and evaluation of the AV–8A Harrier aircraft" is primarily an inhouse effort being performed by the Marine Corps Development Center. The Marine Corps operations analysis group is assisting the Development Center in the conduct of the study by providing the professional analytic expertise beyond the capability of inhouse resources. Thus, the operational evaluation of the AV–8A is funded through two program elements: one for the primary inhouse executor, the Development Center, and one for the supporting agency, the Marine Corps operations analysis group.

Senator YOUNG. Describe briefly the major efforts included in your fiscal year 1973 program for the Center for Naval Analyses.

General BROOKS. I will be glad to do so. In addition to the AV–8A Harrier program the Marine Corps operations analysis group will provide extensive support for the infantry organizations and weapons systems study during the planning, testing, and evaluation phases. It will conduct a follow-on effort to identify sources and causes of data error in the manpower management system, and will recommend changes to improve system operation. Analytic assistance will be provided for the Marine integrated fire and air support system study. Operational test and evaluation support will be provided on a continuing basis through the detachment at the Development Center and the field representatives at Fleet Marine Force, Atlantic and Pacific Headquarters. This group also will be tasked to provide analytic support for short term, quick response projects as the requirements occur.

Chairman ELLENDER. Why do you need the increase of $250,000 you are requesting for fiscal year 1973?

General BROOKS. Mr. Chairman, the Marine Corps operations analysis group provides valuable analytic support for our studies and analysis program. The staff has that extensive practical analytic experience required in support of Marine Corps projects which is not available in-house. In addition, the staff is knowledgeable and experienced in Marine Corps concepts and procedures. The Marine Corps has been unable to duplicate these capabilities even though a concerted effort has been made to increase its inhouse capability. To support this capability the Marine Corps budgeted for $1 million in fiscal year 1972. The approved funding of $700,000 represented a $300,000 or 30-percent reduction. As a result of this reduction the completion of several high priority projects was delayed. Although the fiscal year 1973 request for $950,000 represents an increase of $250,000 over the approved fiscal year 1972 funding it is an increase of only $50,000 over the general level of funding in the years prior to fiscal year 1972. This $50,000 increase equates to a 5-percent cost-of-living increase. The fiscal year 1973 studies and analysis program has been reviewed thoroughly to make it responsive to our requirements. A vital component of this program is the support which will be furnished by the Marine Corps operations analysis group. The requested level of funding is essential to the overall Marine Corps studies and analysis program to insure timely completion of ongoing efforts and initiation of programmed efforts.

CENTER FOR NAVAL ANALYSES, NAVY

Chairman ELLENDER. $6.8 million is requested for Navy efforts by the Center for Naval Analyses. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY-1973 RDT&E DESCRIPTIVE SUMMARY

Title: Center for Naval Analyses, Navy

Category: Management and Support

Budget Activity: 1-Military Sciences

DESCRIPTION: The management and conduct of a continuing program of studies and analytical efforts concerning development of concepts, doctrine, tactics, techniques, weapons systems, forces, and equipment required for all aspects of naval warfare, including amphibious operations. Assistance is rendered to the operating forces by means of operational analyses to help improve current force capabilities and to provide operational data bases for other studies and analyses. The program is executed by coordinated efforts of the Institute of Naval Studies, Naval Warfare Analyses Group, Systems Evaluation Group and Operations Evaluation Group.

WORK PERFORMED BY: The Center for Naval Analyses (CNA) which is administered under contract to the University of Rochester. The main office of CNA is situated in Arlington, Virginia. Between twenty-one and twenty-five representatives serve with fleets and commands of the Navy and Marine Corps in the United States and overseas.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program: Among the studies underway in FY-1972 are:

a. Strategic Studies - These analyses examine near-term programs for improving FBM force, develop comparisions with alternative ULMS programs, assess effectiveness of various air-breathing weapon systems against Soviet defenses, and measures benefits of diversification of cruise missile systems. Results of analyses will serve as inputs to comprehensive examination of most effective force mix of land-based ICBMs, bombers, and SLBMs against projected Soviet threats.

b. Total Force Planning for Mediterranean Conflict (TALLFORM) - An examination of capabilities of various designs and compositions of U.S. forces.

c. New Concepts for Defense of SLOC's (ATLANTIS) - Study features research into new uses of current and new design general-purpose forces for protecting U.S. deployments abroad. Study considers alternatives to traditional convoying concepts, ways of exploiting surveillance information, and techniques for denying tactical initiatives to enemy.

d. Analyses of General-Purpose Force Capabilities - Include: air warfare, undersea and anti-air warfare systems and tactics and sea interdiction. Analyses of Soviet naval tactics and of counters are continuing. Direct analytical support being given to operational commanders in conducting tests, exercises, and combat operations.

e. Naval Gunnery Study - Continuation of work begun in FY-1971, examines possible contribution of gun systems as cost-effective alternatives to other systems, from point of view of performance, growth potential, technical risk, IOC date, and reliability.

f. Future Submarine Forces Study - An examination of potential, different missions for submarines in 1980's and 1990's. Various combinations of submarines, sensors, and weapons will be investigated for capability, vulnerability, and cost.

FY 1973 Planned Program: Strategic, tactical, logistics, and conceptual studies will be continued and initiated under definite program to be determined by problems and issues arising during FY-1972. At time when Soviet seapower is continuing to grow and our Navy's size, composition, and forces are undergoing drastic changes, we are particularly in need of high-quality analytical support we have always received from CNA.

RESOURCES: ($ in thousands)

	FY 1971	FY 1972	FY 1973	Additional to completion	Total Estimated Cost
RDT&EN	$6,600	$6,500	$6,800	Continuing	NA

Senator YOUNG. Is the Center for Naval Analyses supported in its entirety by the funds requested in research and development by the Navy and the Marine Corps—in other words, in fiscal year 1973 by the $6.8 million being requested by the Navy and the $950,000 being requested by the Marine Corps?

Dr. FROSCH. No, sir; there is additional funding. Requested CNA funding for fiscal year 1973 includes support of a basic program of operations research and studies, and five separately funded analytical efforts. This table which I will provide for the record shows the total funds requested by the Navy for support of CNA in fiscal year 1973.

Item	*Fiscal year 1973 submission*
R. D. T. & E., Navy:	
Studies and analyses, Navy	($6,800,000)
Studies and analyses, M.C	(850,000)
Total	(7,650,000)
ASW management and support (TAG)	(1,400,000)
NAVELEX	(100,000)
Total R. D. T. & E. Navy	9,150,000
O. & M., Navy:	
Naval intelligence	(330,000)
Naval communications	(271,000)
Naval War College	(25,000)
Total O. & M., Navy	626,000
Total Navy fiscal year 1973 request	9,776,000

Dr. FROSCH. In preparing our request, we have restricted our fiscal year 1973 program to 105 percent of the amount authorized by Congress in fiscal year 1972.

In addition to its work for the Navy, CNA does do a small amount of work for D.D.R. & E. (estimated at $90,000 in fiscal year 1973), and some nondefense work. CNA's nondefense work has never exceeded 4 percent of its total defense effort and the President of CNA keeps the Navy informed of these nondefense plans and programs.

Chairman ELLENDER. Give us a brief description of your major programs for fiscal year 1973.

Dr. FROSCH. Yes, sir, I will be happy to do so. The requested funding for fiscal year 1973 is to support a basic program of operations analysis and studies, and separately funded analytical programs. The answer to the questions on the study program involve an understanding of how the CNO program is formulated. OPNAV is currently defining its study needs by defining the important issues that will confront the Navy in the coming year. The CNA program cannot be specified in detail until the Navy has defined its needs, and the major policy issues have been clarified by the Secretary of Defense in fiscal and policy guidance statements. The Navy, of course, is in a position to broadly outline the study program, but exact definition of the specific issues to be addressed at CNA will not be made before June. The CNA program will contain studies in four basic areas. Tentative suggestions as well as the associated program elements are discussed in this paper which I will provide for the record.

(The information follows:)

NAVY STUDIES AND ANALYSES

Warfare, technical and support studies

Strategic studies of offense and defense mixes, command and control, SALT proposals, integration of new strategic systems into the force.

General Purpose Force studies of sea control, readiness, tactical air requirements, total force capabilities.

Naval strategy studies include Soviet naval operations, Mutual Balanced Force Reduction (MBFR).

Implications of new technology includes prototyping, improved gunnery, Electronic Warfare (EW) and Command and Control (C^2), Naval Air Technology, surface escort concepts, applications of electro-optics in weapon's development.

Logistics and Shore Support studies might consider shipyard workload planning, procurement policy, mobilization requirements, maintenance and spare parts policies.

Manpower studies to examine recruiting, evaluation of "people programs," retention analysis, procurement alternatives.

Resource Analyses to develop methodologies and data bases for pilot training, system studies, cost estimation.

Operations Research/Field Program

Operations analysis and fleet support. Anti-Submarine Warfare (ASW) and Under Sea Warfare (USW) analyses include submarine escort analysis, submarine tactical communications, Sea Control Ship (SCS) evaluation. Air warfare studies examine anti-surface ship air attack tactics, operational effectiveness of new weapons, TYCOM tactical development, the CV evaluation, Lighter than Air Multi-Purpose Ship (LAMPS). Surface warfare analysis to examine lessons learned in Southeast Asia in-shore operations ,and anti-ship missile defense. Anti-air Warfare includes exercise analysis, tactical models, and F–14 evaluation.

Field Program involves support of 18 field billets at operating and test commands.

Analyses for Electronics Systems Cmd involve evaluations of Command and Control (C^2) systems and technologies.

Communications Analysis with emphasis on satellite communications and integration with non-satellite systems, shipboard communications problems.

Naval War College support involves assignment of one analyst who occupies the chair of physical science.

USMC PROGRAM

Marine Corps studies of USMC manpower management, the HARRIER evaluation, infantry troop tests, helicopter operations and bases in Southeast Asia, aircraft vulnerability, close air support, air defense, program cost analysis.

Field program includes support of 4 field billets at USMC activities.

ASW TACTICAL ANALYSIS GROUP

Analytical support of 22 field billets at user commands and 6 in Washington; emphasis on patrol aircraft tactics, Lighter than Air Multi-Purpose Ship (LAMPS), surveillance, Submarine Escort (SSN(E)) evaluation, tactical deception, exercise design & evaluation, & submarine attack tactics.

CRYPTOLOGIC ACTIVITIES

This represents a continuing series of studies of Naval Communications Systems and Requirements. This analytical effort has resulted in studies of data link vulnerability and the effects of countermeasures on system design. The current research program which will probably be continued in FY–73 includes research on data link requirements advanced technology communications and spread spectrum communications.

Senator YOUNG. What new efforts are being considered for fiscal year 1973?

Dr. FROSCH. Since the fiscal year 1973 program is still being planned, the exact mix of new initiatives and continuing efforts cannot be specified in detail. The field support programs, Southeast Asia combat anal-

ysis, the sea control ship evaluation, the total force planning analysis, and some additional manpower analysis, are examples of efforts that will carry over into fiscal year 1973. There undoubtedly will be some others, but in almost all cases, the specific analytical tasks will be different than those conducted in fiscal year 1972. Examples of new initiatives would include studies related to SALT, SSB(N), command control, and communications, mutual balanced force reductions, surface escort concepts, and development of tactics for Naval surface missiles.

Chairman ELLENDER. How many professional employees do you expect to have at the Center for Naval Analyses in fiscal year 1973, and how does this number compare with the numbers for fiscal years 1971 and 1972?

Dr. FROSCH. Our request for fiscal year 1973 is intended to support a professional staff level of 192 which is consistent with this year's budget level of 192 for Navy work. In fiscal year 1971, the Center had an average professional staff size of 201.

Chairman ELLENDER. Just why do you need the increase of $300,000 you are requesting for fiscal year 1973?

Dr. FROSCH. The fiscal year 1973 request does not involve an increase in the level of effort at CNA. The small dollar increase is to offset rising costs, and is within the guidelines received from the Office of the Secretary of Defense for fiscal year 1973 submissions. It is also consistent with intent expressed last year by the Senate Armed Services Committee. The Navy-wide demand for CNA assistance is significantly greater than they can provide at the budget level we have requested.

AIRCRAFT AND RELATED EQUIPMENT

Chairman ELLENDER. The request for fiscal year 1973 includes $380.9 million for the budget activity entitled "Aircraft and Related Equipment." How much was provided for this budget activity in fiscal years 1971 and 1972?

Dr. FROSCH. A total of $762.1 million was provided for this budget activity in fiscal year 1971, and the fiscal year 1972 estimate is $613.4 million.

A–6 SQUADRONS

Chairman ELLENDER. $4.9 million is requested for research and development associated with the A–6 aircraft. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: A-6 Squadrons

Category: Operational Development Budget Activity: 2-Aircraft and Related Equipment

BACKGROUND: Past experience reveals need to establish an orderly hardware development effort, integration design, and management plan for the parent aircraft weapon system and air launched ordnance carried by such aircraft. Accordingly, this program element provides for the development of night/day attack sensors, their integration into A-6 aircraft and provides for their operation with sophisticated and conventional ordnance.

DESCRIPTION: Project is directed toward design and incorporation of equipment and hardware required for integration of CONDOR missile and associated avionics into A-6 series aircraft. It will also provide A-6E aircraft with a passive ingrared imaging device for target identification, a laser target designator/ranger boresighted with the infrared sensor for delivery of laser guided weapons, and a laser search set to locate targets illuminated by external laser designators.

WORK PERFORMED BY: Contractors not yet selected. Contenders are GRUMMAN AEROSPACE, TEXAS INSTRUMENTS, HIGHES AIRCRAFT, WESTINGHOUSE and BELL AEROSPACE. Naval Field Activities to be determined.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAM:

FY 1972 Program: Initiate A-6 Target Recognition Attack Multisensor (TRAM) Program for required Fleet Introduction Date in third quarter Fiscal Year [Deleted]. Complete aerodynamic feasibility testing of the A-6 TRAM proposed configuration. Conduct a detailed A-6 TRAM configuration study and prepare procurement specifications. Award incrementally funded contract(s) for design and development of A-6E TRAM Components and installation.

FY 1973 Planned Program: Complete TRAM avionics design. Initiate prototype aircraft modification. Complete prototype avionics fabrication. Perform integration design for incorporation of CONDOR missile and associated avionics into A-6 series aircraft.

Program to Completion: FY 74: Initiate advanced procurement for limited TRAM production. Initiate TRAM modification to A-6 training devices. FY 75: Implement limited production and receive first deliveries.

RESOURCES: ($ in Millions)

	FY 1971	FY 1972	FY 1973	Additional to Comp.	Total Est. Cost
RDT&EN	0	2.5	4.9	13.9	19,825

Senator Young. Of the $4.9 million requested, I note that $500,000 is for the project entitled "A–6E/Condor Integration." This appears to be a new effort. Please describe what will be done in this field in fiscal year 1973 and tell us what you hope to accomplish.

Dr. Frosch. Although new weapon systems are basically designed for use on particular launch platforms, experience has shown that some minor design effort is needed to optimize the weapon-platform integration. The $500,000 in fiscal year 1973 will be used primarily to ensure that the A6E avionics are compatible with the Condor missile.

Chairman Ellender. I note in your statement that the test objectives for the Condor missile in its demonstration flights were successfully completed in August of 1971. It is further stated that the next step in this development program will be to conduct Technical and "Quasi OPEVAL" using Navy personnel. Since the Navy is only beginning the evaluation of this missile, why is this $500,000 being requested for fiscal year 1973 to integrate the Condor into the A–6 aircraft?

Dr. Frosch. The Navy evaluation of Condor will be completed during the second quarter of fiscal year 1973 with a production go ahead expected shortly thereafter. Consequently, the $500,000 is required in fiscal year 1973 to insure that production line Condor missiles are properly integrated with the A–6E aircraft and, conversely, to ensure that the A–6E's configuration is optimized for Condor employment.

Senator Young. I note in the descriptive summary that activities being carried out in other agencies related to this effort include the Army's Southeast Asia Night Operations Program. Tell us what the relationship between these two programs is.

Dr. Frosch. The Army's Southeast Asia Night Operations Program is now being phased out, however, the technology interrelationship has benefited both services. The Army has their helicopter Night Landing System, Cobra Night Fire and Control System and their Aerial Scout Program. Their similarity to the A–6 TRAM program is the use of imaging infrared sensors to permit aircrews to see at night.

Chairman Ellender. Of the $4.9 million requested for the A–6 squadrons, $4.4 million is for the project entitled "A–6E/Target Recognition Attack Multisensor." What is the purpose of this program?

Dr. Frosch. Naval operations require an improved capability to classify and identify potential Naval targets at night. This is essential for improved continuity on enemy dispositions and actions. The A–6 must assume an increased reconnaissance role and, in the event of limited or general war actions provide improved nighttime target strike operations against many targets. To this end, the A–6E target recognition attack multisensor program will provide the A–6E aircraft with a passive infrared imaging device for target classification and identification, a laser target designator/ranger boresighted with the infrared sensor for delivery of laser guided weapons, and a laser search set to locate targets illuminated by external laser designators. The three devices will be colocated with a space stabilized line of sight mount for accurate target tracking and will be directed to suspected targets by the search and acquisition radar.

Chairman ELLENDER. I note that the work on this project is to be performed by Grumman Aerospace Corp. and naval field activities. How will the work be divided between these two?

Dr. FROSCH. The fiscal year 1973 funds will be divided approximately as follows: Naval field activities, 10–20 percent; TRAM avionics equipment vendor, 50–60 percent; and Grumman integration efforts, 20–30 percent. The variance is caused by the fact that contracts are not yet signed. In fact, the bulk of the funds will go to an avionics vendor—not yet selected. Grumman is mentioned as the most likely company to integrate the TRAM avionics package into the A–6E aircraft primarily because they build the aircraft.

Senator YOUNG. Please give us a brief description of your accomplishments in this program during fiscal year 1972 to date.

Dr. FROSCH. We initiated the program this fiscal year including completion of aerodynamic feasibility testing of the A–6 TRAM turret proposed configuration. Preliminary design contract specifications have been prepared based on configuration studies and operational requirements. Commonality of components with the A–7 TRAM program is being defined.

Senator YOUNG. What do you expect to accomplish during fiscal year 1973?

Dr. FROSCH. We will conduct the avionics engineering design, followed by initiation of the prototype development. Included in this design will be the TRAM/Condor interface requirements.

Chairman ELLENDER. I note that the total estimated cost of this project is $24,625,000 of which $3.3 million was provided in fiscal year 1972 and $4.4 is requested for fiscal year 1973. An additional $16.9 million will be required to complete this program. Tell us what this $16.9 million will be used for.

Dr. FROSCH. The total R. & D. funds will be used to procure the prototype R. & D. avionics subsystems and associated support, perform aircraft modification and integration, complete contractor and Navy technical evaluations and initial operational test and evaluation. These steps will give us a proven package suitable for procurement.

Chairman ELLENDER. Why do you need the increase of $1.1 million you are requesting for fiscal year 1973?

Dr. FROSCH. The fiscal year 1973 R. & D. funding profile is $1.1 million greater than that of fiscal year 1972 primarily because the project momentum will be greater in fiscal year 1973 than in fiscal year 1972. More personnel will be involved, both in the Aerospace Industry and at Navy laboratories. It's the normal bell shaped curve you see in most R. & D. programs.

A–7 SQUADRONS

Chairman ELLENDER. $3.6 million is requested for efforts associated with the A–7 aircraft. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

A–7 SQUADRONS

CATEGORY: OPERATIONAL DEVELOPMENT

Background.—Past experience reveals need to establish an orderly hardware development effort, integration design, and management plan for the parent air-

craft weapon system and air launched ordnance carried by such aircraft; accordingly, this program element provides for the development of a night/day sensor package (infrared, laser), and provides for its operation with sophisticated and conventional weapons.

Description.—This element is directed toward design and incorporation of equipment required for integration of an improved Walleye II data link into the A–7E aircraft. It will also provide the A–7E aircraft with a passive infrared imaging device for target identification and a laser spot tracker to locate targets illuminated by external laser designators.

Work preformed by.—Vought Aeronautics Corporation, Dallas, Texas; Avionics contractor(s), and Naval Field Activities to be determined. Martin Marietta Corporation, Orlando, Florida; Hughes Aircraft Corporation, Tucson, Arizona.

Program Accomplishments and Future Program:

Fiscal year 1972 program.—Initiate A–7 Target Recognition Attack Multisensor (TRAM) Program and complete aerodynamic feasibility testing of the proposed configuration. Award incrementally funded contract(s) for design and development of A–7E TRAM components and installation.

Fiscal year 1973 planned program.—Complete TRAM Avionics design. Initiate prototype aircraft modification. Complete prototype avionics fabrication. Develop changes to the Walleye/A–7E data link system made necessary by the improved Data Link being developed.

Program to Completion.—Fiscal year 1974: Initiate advanced procurement for limited production. Initiate TRAM modification to A–7 training devices. Implement limited production and receive first deliveries.

Resources.—(In thousands of dollars:)

R.D.T. & EN. funds for fiscal year 1971, $0; fiscal year 1972, $2,700; fiscal year, 1973, $3,560; additional funds to completion are continuing; and the total estimated cost is not available.

A–7E/WALLEYE II

Chairman ELLENDER. Of the $3.6 million requested, $100,000 is for the project entitled "A–7E/Walleye II [deleted] integration." Has the committee been furnished with information on this project?

Dr. FROSCH. Yes, sir; the information is included in the descriptive summary for A–7 squadrons.

A–7E/TRAM

Chairman ELLENDER. Of the total requested for R. & D. associated with A–7 squadrons, $3.5 million is for the project entitled "A–7E/Tram." How is this effort connected with the effort to install the Tram on the A–6 aircraft?

Dr. FROSCH. The A–7 Tram effort is directly related to the A–6 Tram. However, the A–7 system will be less complex, tailored to a single-piloted aircraft. It will extend the excellent day visual strike ability of the A–7E to night missions, and provide a capability to passively identify and classify potential naval targets at night. Maximum feasible system component commonality with the A–6 Tram will be directed and enforced.

Senator YOUNG. I note in the descriptive summary that the program for fiscal year 1972 is stated at $2.7 million, including $2.2 million requested in a fiscal year 1972 supplemental. What effect would it have on this program if the Congress failed to approve the $2.2 million supplemental request?

Dr. FROSCH. Of course we have put our highest priority needs in the fiscal year 1972 supplemental funding request and hope for approval. Alternatively, we are investigating the possibility of reprograming funds in fiscal year 1972 into this program in order to get an adequate start. Without the supplemental funding our initial operating capa-

bility in the fleet will slip by about 1 year; our production (or procurement funds) allocated will not dovetail with the R. & D. funds; the unit cost of procurement will increase because we cannot install the Tram system on aircraft on the production line in the early years. Also, if we do not fund both the A–7 and A–6 Tram systems commensurably with equal developmental milestones, we cannot achieve maximum commonality and optimum system performance. It is therefore important that both A–7 and A–6 Tram programs be mutually funded to provide comparable development rates.

Chairman ELLENDER. According to the descriptive summary, the total estimated cost of this program is stated at $18.6 million. Assuming that the supplemental request of $2.2 million is approved, there will remain $12.4 million needed for completion of this program. What will this $12.4 million be used for?

Dr. FROSCH. The funding will be used for engineering development, prototype avionics systems and associated support, airframe integration, technical evaluations, equipment qualification testing, and an initial operational test and evaluation. These development program steps will provide us with fully qualified systems and a procurement data package to permit an orderly transition to production.

Chairman ELLENDER. Why do you need the increase of $760,000 you are requesting for fiscal year 1973?

Dr. FROSCH. The program was just started and the increase of $760,000 is required to meet expected contractual obligations for effort that will begin this year.

F–14 AIRCRAFT

Chairman ELLENDER. The next request is for $162.6 million for the Navy's F–14 aircraft. As I understand the request, $58 million of the total is for the continuation of the development and testing of the F–14A, and $104.6 million is for the continuation of the Navy's participation in the development of the advanced technology engine to be used in the F–14B aircraft. Am I correct about this?

Dr. FROSCH. This is correct, sir.

F–14A

Chairman ELLENDER. Selected paragraphs from pages 93 and 94 of the descriptive summary on the F–14A will be included in the record at this point.

(The information follows:)

F–14 SQUADRONS

CATEGORY: OPERATIOAL SYSTEMS DEVELOPMENT

Background.—The threat of Soviet bombers armed with 100 to 150 mile range air-to-surface missiles, coupled with the threat of anti-shipping missiles, and the newest Soviet fighters (FISHBED, FOXBAT, and FLAGON) has severely taxed the performance of present Navy fighters (F–8 and F–4). These fighters were first introduced into the Fleet over ten years ago and are not capable of matching the threat. The feasible growth potential of the F–8 and F–4 has been expended. The F–14A will fill the present gap in Navy air capability. No other fighter is available in either the Air Force or the Navy to match the performance of the F–14A.

Description.—The F–14A will be a new technology airframe equipped with a long range fire control system that can acquire and track multiple targets, and

conduct multiple missile attacks with air-to-air missiles. The aircraft will operate as an airborne combat air patrol or deck launched interceptor in conjunction with an airborne early warning aircraft, shipboard combat information center, land based fighter-director radar system, or autonomously. The TF30–P–412 engine will be incorporated to provide the performance required by SOR W16–27. Having very high aircraft performance and the flexibility of a mix of air-to-air weapons, the F–14A will perform all fighter missions.

Work performed by.—Naval Missile Center, Point Mugu, California; Naval Air Development Center, Johnsville, Pennsylvania; Naval Air Test Center, Patuxent River, Maryland; Grumman Aerospace Corporation, Bethpage, Long Island New York; Pratt and Whitney, East Hartford, Connecticut; Hughes Aircraft Company, Los Angeles, California.

Fiscal year 1972 program.—Continuation of the F–14 R.D.T. & E. flight test program to reach an adjusted BIS date of 15 February 1973 is underway. First Navy Preliminary Evaluation began November 1971. Option for second production lot of 48 aircraft was exercised on 30 September 1971.

Fiscal year 1973 planned program.—The F–14A BIS is scheduled to begin in approximately February 1973. Initial Operational Capability (IOC) will be achieved July 1973.

Program to completion.—FY 1974 requirements are under review. Possible program impacts caused by further development flight schedule slippage may include additional funding of $10.4 million for FY 1974.

Resources (In thousands of dollars):

R.D.T. & E., N. funds for fiscal year 1971 and prior, $883,812; fiscal year 1972, $128,100; fiscal year 1973, $58,000; additional funds to completion are $6,000; and the total estimated cost is $1,075,912.

F–14A

Senator YOUNG. I wish you would comment in detail on what you will do with the $58 million you are requesting for work on the F–14A during fiscal year 1973.

Dr. FROSCH. During fiscal year 1973, we will continue our F–14A test program. We completed the first Navy preliminary evaluation (NPE) in December 1971, with gratifying results. The NPE II will commence in July 1972. During NPE II, flight evaluation tests will be conducted at the Naval Test Center, Patuxent River, Md., and at the Naval Missile Center, Point Mugu, Calif. The tests at Patuxent River will involve investigations of the flying qualities of the F–14A including aircraft carrier suitability. The test at Point Mugu will thoroughly evaluate the performance capabilities of the F–14A/AWG–9/Phoenix weapon system and will include firings of Phoenix, Sparrow, and Sidewinder missiles. The third and final NPE will commence in October 1972. This evaluation will be conducted in the same manner as NPE I and II. The total NPE program will form the basis for the board of inspection and survey trials (BIS) which are scheduled to commence in February 1973. In addition, F–14 engine testing will be conducted at the Navy Engine Test Facility at Trenton, N.J.

Chairman ELLENDER. As I recall, the first F–14A test aircraft was lost as the result of a complete hydraulic system failure. Have the deficiencies in that hydraulic system been corrected?

Dr. FROSCH. Yes, sir.

Chairman ELLENDER. As I recall, there are 12 aircraft in the F–14A testing program. Am I correct about this?

Dr. FROSCH. Yes, sir, with regard to R. & D. aircraft in the contractor development program including the one aircraft we lost, additional production aircraft will be used in Navy technical and operational evaluation testing.

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Senator YOUNG. Earlier, you stated that there are now eight F–14A's flying, and we lost one for a total of nine. When will the remaining three aircraft in the R. & D. program be delivered?

Dr. FROSCH. Deliveries of the remaining aircraft with the exception of No. 7 are expected before the end of April. The No. 7 F–14, which will be the first aircraft to be equipped with the advanced technology engine, has been set aside awaiting completion of the development of that engine.

Chairman ELLENDER. On page 94 of the descriptive summary, I note reference to different types of evaluations. The first is referred to as Navy preliminary evaluation, and the second is referred to as board of inspection and survey trials. Please comment on the basic purpose of these evaluations, and indicate how they differ.

Dr. FROSCH. Navy preliminary evaluations are, as the title implies, the preliminary evaluation of the aircraft. These evaluations are intended to identify gross deficiencies in the weapon system early in the development cycle. In this manner the deficiencies, some major and many minor, are identified early to facilitate the timely and proper corrective action. These evaluations are a series of tests conducted by Navy personnel at intervals during the contractor development and demonstration test program for the purpose of initiating and carrying forward the operational suitability assessment program, which continues through the development period.

Board of inspection and survey (BIS) trials are a test program established by law in Navy regulations and conducted on production representative hardware by a board appointed by the Secretary of the Navy for the purpose of determining contractual compliance. The findings and recommendations of the BIS board are reported to be Secretary of the Navy via the Chief of Naval Operations for his use in making a decision regarding final acceptance or rejection for Naval service.

Chairman ELLENDER. On page 2 of the data sheet, in connection with the performance requirements for this aircraft, it is indicated that speed, combat radius, and ceiling have not been demonstrated. Will these performance requirements be demonstrated in one of the two evaluations we just discussed, and if so, which one?

Dr. FROSCH. Data necessary to validate performance requirements cited in the data sheet will be acquired during the contractor development flight test program. These tests are performed by the contractor using the prototype or R. & D. models for the purpose of demonstrating performance against the contractually invoked specification requirements. The Navy witnesses these demonstrations and verifies that the contractor has or has not met the demonstration requirement.

Senator YOUNG. If I read the procurement data correctly, Congress has provided funds for 74 production aircraft through fiscal year 1972, and you are requesting 48 in 1973, for a total of 122 production aircraft before we have demonstrated these basic performance requirements. Am I correct about this?

Dr. FROSCH. You are correct in that we will have 122 aircraft on order before the contractor has completed his final demonstrations. However, we have and will continue to check his progress through use of Navy preliminary evaluations, the first of which was satisfactorily completed in December, and the second is scheduled for this summer.

Chairman ELLENDER. On page 94, I note the following statement: "Initial operational capability will be achieved in July 1973." Do you expect to achieve this scheduled date, and if not, when do you expect this airplane to be operational?

Dr. FROSCH. We expect to meet the July 1973 date.

Chairman ELLENDER. I note on page 94, that the total estimated cost of the R. & D. effort for the F–14A is now estimated at $1,075.9 million. How does this compare to the original estimated cost of the development of the F–14A?

Dr. FROSCH. The original F–14A program development cost estimate of $731 million made in 1969, was based on a six-aircraft R. & D. program. The estimate encompassed the fiscal year 1969–73 timeframe. The budget submit estimate of $1,075.9 million encompasses the period fiscal year 1969–74 and evolves from the changes as summarized in this tabulation which I will submit for the record.

	(*Millions*)
Original estimate (1969)	$731.0
Congressional transfer of 6 A/C to R. & D	(266.5)
Recouped F–111B funds assigned to F–14 by Congress	(31.5)
Loss of No. 1 aircraft impact on schedule test program	(40.1)
Increase in TF30–P–412 engine cost	(6.8)
Total	344.9
Fiscal year 1973 budget submit estimate	1,075.9

Senator YOUNG. On page 94, under the heading "Program to Completion," I note the following statement: "Possible program impacts caused by further development slight schedule slippage may include additional funding of $10.4 million for fiscal year 1974." Would you please comment on this statement?

Dr. FROSCH. The loss of the first aircraft and the delay in the advanced technology engine development program require restructuring of the flight test program which may incur additional flight test development costs.

Chairman ELLENDER. Earlier, in commenting on the results of the first Navy preliminary evaluation, you referred to 33 major deficiencies. I wish you would provide a statement for the record on these 33 major deficiencies, and indicate what has been done or what will have to be done to correct each.

Dr. FROSCH. All of the deficiencies have been addressed individually and close coordination is being maintained between the Navy and the contractor to insure correction of deficiencies. There is agreement in a course of action for all items.

Chairman ELLENDER. With respect to the deficiency involved in the performance of the engine at low speed and high altitude, which you indicated the engine manufacturer feels he understands, how much of a problem do you think this is?

Dr. FROSCH. The engine adjustments necessary to resolve this deficiency are relatively minor and modified engines will be available for the second Navy preliminary evaluation this summer.

F–14B PROGRAM

Chairman ELLENDER. The request includes $104.6 million for the continuation of the Navy's participation in the development of the

advanced technology engine. Selected paragraphs from pages 95, 96 and 97 of the descriptive summary will be included in the record at this point.

(The information follows:)

F–14 SQUADRONS

CATEGORY: OPERATIONAL DEVELOPMENT

Background.—The threats to be countered by the F–14B are a broad band of Soviet aerial weapons. Air-to-Surface Missiles (ASM) launched from masses of enemy bombers at ranges of 100 to 150 miles pose the primary threat to the carrier task force. The bomber/ASM threat can be compounded through the inclusion of jammers and escort fighter aircraft in the attacking force. Enemy bombers may be escorted by such aircraft as the MIG–21 FISHBED, MIG–23 FOXBAT, and FLAGON aircraft. Another and probably graver threat is the anti-ship suface-to-surface cruise missiles with the range [deleted] varying from 30 miles [deleted[to 450 miles [deleted].

In order to counter threats, the F–14B will possess the qualities desired for both the Fleet Air Defense and Air Superiority roles. This aircraft will have long endurance, high speed, excellent radar detection range against large and small targets, and long range missiles. It will also possess a radius to Navy strike aircraft, excellent maneuverability, improved transonic acceleration, high supersonic speed and the same weapons flexibility of the F–14B.

The improved radius of action, transonic acceleration and increased energy maneuverability are brought about by the installation of the advanced technology engine now designated as the F401–PW–400. No other combination of attributes is available in a fighter aircraft to match the F–14B in the time period discussed.

Description.—The F–14B is a high performance fighter aircraft powered by an Advanced Technology Engine (ATE), now designated the F401–PW–400. The engine program was directed towards developing an engine for the F–14 and F–15 aircraft with a common gas generator, or core. The Navy version will produce 36% more thrust and weigh 25% less than the TF30–P–412 engine in the F–14A.

Work performed by.—Naval Laboratories; Pratt and Whitney, West Palm Beach, Florida; and Grumman Aerospace Corporation, Rathpage, Long Island, New York.

Fiscal year 1972 program.—The Navy will continue to participate in the design and development of the F–14B/F–15 engine. However, due to technical problems and a restructuring of the F–401 engine development, no production decision will be made until such time as the engine is proven tecnically sound.

Planned fiscal year 1973 program.—Engine development and F–14 airframe interface efforts will continue. An XF401–PW–400 engine will be delivered to Grumman for ground test in October 1972. The Preliminary Flight Rating Test (PFRT) of the F401–PW–400 engine has been delayed until December 1972 which is the earliest date Pratt and Whitney has estimated that an engine will be available which will perform within five percent of specification requirements, and meet PFRT reliability. The first prototype F401–PW–400 is expected in December 1972. The first prototype F–14B flight is scheduled in April 1973. F–401 Military Qualification Tests contractually is June 1973.

Program to completion.—Provide for continued engine development, flight testing and F–14 airframe interface effort prerequisite to Bureau of Inspection and Survey (BIS) Trails. Fiscal 1972 funding requirements are under review as a result of delays in the engine development program caused by technical problems. F–14B Bureau of Inspection and Survey (BIS) Trials commence in July 1974.

R.D.T. & E., N. funds for fiscal year 1971 and prior, $148,780; fiscal year 1972, $100,230; fiscal year 1973, $104,600; additional funds to completion are $7,000; and the total estimated cost is $360,610.

F–14B PROGRAM

Senator YOUNG. Now, as I understand this item, it is exclusively for work on this new engine and the airframe changes required for the installation of this engine in the F–14. Am I correct about this?

Dr. FROSCH. You are correct, sir.

Chairman ELLENDER. On page 95 of the descriptive summary, in discussing this engine, I note the following statement: "The Navy version will produce 36 percent more thrust and weigh 25 percent less than the TF30–P–412 engine in the F–14A." What will this mean in increased performance for the F–14 aircraft?

Dr. FROSCH. The decrease in engine weight will contribute to increased aircraft capability in all areas of performance and the large increase in thrust will enhance aircraft capability in all areas of performance where excess thrust available is important, for example, rate of climb, acceleration, altitude ceiling, et cetera. The additional thrust will also significantly improve aircraft capability in the "dogfight" part of the air superiority arena.

Senator YOUNG. Do you have an estimate of what the increased cost in the production of the F–14B would be over the cost of production of the F–14A?

Dr. FROSCH. The Navy has no approved F–14B production program at this time. The Navy had made a cost estimate of the increase associated with the F–14B if incorporated into aircraft beginning with fiscal year 1974 (lot VI) through fiscal year 1975 (lot VII). These estimated costs are: Nonrecurring Grumman, $15 million; nonrecurring, Pratt & Whitney, $18 million; Grumman recurring, $15 million; Pratt & Whitney recurring, $110 million; support costs, $50 million; and spares costs, $19 million, for a total of $227 million.

Chairman ELLENDER. It is my understanding that, under current plans, the 301 F–14 aircraft approved for production will all be F–14A's. Am I correct about this?

Dr. FROSCH. You are correct, sir.

Chairman ELLENDER. How does the Navy's version of the advanced technology engine differ from the Air Force's version that is used in the F–15 aircraft?

Dr. FROSCH. The two engines utilize a common core (that is, compressor, combustor, and high pressure turbine). The F401 engine is rated at higher thrust and has [deleted] airflow. The fan is larger in diameter and has a stub stage to supercharge the compressor. In addition the augmentor and nozzle are larger to accommodate the higher airflow, and thrust requirements. Both F100 and F401 engines use identical accessory gear boxes and similar control systems.

Senator YOUNG. I note on page 96 of the descriptive summary that the first prototype F–14B flight is scheduled for April 1973. What was the original scheduled date for this event?

Dr. FROSCH. The original scheduled flight date was July 1971.

Chairman ELLENDER. What is the current total estimated cost of the development of the advanced technology engine, and how much of this is to be provided by the Navy, and how much is to be provided by the Air Force?

Dr. FROSCH. The current estimate of the engine development cost which is the negotiated Government liability through fiscal year 1974 for both advanced technology engines (F100, Air Force and F401, Navy) is $403.6 million with approximate equal shares to both services.

E–2C EARLY WARNING AIRCRAFT

Chairman ELLENDER. The request includes $14.1 million for the continuation of development and testing of the E–2C carrier-based early

warning aircraft. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Category: Operational Development.—Title: Early Warning Aircraft Squadrons; Budget Activity: 2-Aircraft and Related Equipment.

Background.—In July 1966, planned procurement of 10 E–2A's was cancelled. At that time, total of 59 E–2A's had been placed under procurement, with delivery of last aircraft scheduled for February 1967. A quantitative deficit of CV–AEW aircraft resulted from this action; however, a new suit of avionics to improve operational capability and reliability/maintainability was considered mandatory. The present planned procurement of [deleted] aircraft is to supplement the existing E–2 inventory (All E–2A's have been modified by replacing the special purpose data processing computer with a general purpose type and redesignating them as E–2B's). Of the 59 aircraft procured, [deleted] operational E–2B's remain, and based on present force levels, [deleted] E–2C's will minimally meet the existing inventory deficiency.

Description.—The E–2C is an all-weather, carrier based combat information center airplane which extends task force defense perimeters by providing early warning of approaching enemy units and vectoring interceptors into attack position. It features a new generation of avionics which incorporates [deleted] radar detection capability, a PDS (Passive Detection System) and offers improved reliability/maintainability. The E–2C utilizes the E–2A airframe with minor modifications. It has a high wing and is powered by two T56–A–422 turboprop engines. It is easily identified by the 24-foot diameter rotodome (antenna housing) and the four vertical tails. Other additional characteristics are:

Length/span, 57'6''/80'7''.

Take off weight, 51,535 lbs.

Cruise speed @ 25,000', 270 kts.

Crew, 5 (pilot, co-pilot, radar operator, air-control officer and CIC officer).

Work performed by.—Grumman Aerospace Corp., Bethpage, L. I., New York is the prime contractor. Principal sub-contractors are:

Equipment and company:

Radar—General Electric, Utica, New York.

Radar Detector Processor—General Electric, Utica, New York.

Rotodome—Randtron Co., San Mateo, California.

Displays—Hazeltine Corp., Little Neck, New York.

IFF (Identification, Friend or Foe) Detector Processor—Hazeltine Corp., Little Neck, New York.

Computer and Navigation Boxes—Litton Data Systems Division, Van Nuys, California.

Equipment Cooling and Air Conditioner—Garrett Corp., Los Angeles, California.

Landing Gear—Bendix Corp., South Bend, Indiana.

Passive Detection System—Litton Systems, College Park, Maryland.

Auto-Pilot—Sperry Rand Corp., Phoenix, Arizona.

Data Links—Collins Radio, Cedar Rapids, Iowa

Seats—Aircraft Mechanics, Colorado Springs, Colorado.

Flap System—Kelsey Hayes, Springfield, Ohio.

The principal Navy facilities utilized for this project are:

Naval Air Test Center, Patuxent River, Maryland—Testing required for Naval Preliminary Evaluations and Board of Inspection Survey.

Naval Missile Center, Point Mugu, California—Qualification testing of major sub-systems.

Fleet Computer Programming Center, Pacific, San Diego, California—Monitoring of Tactical Software Program.

Commander, Operational Test & Evaluation Force, Norfolk, Virginia—Monitor Operational Test and Evaluation.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—Flight testing and laboratory integration will continue. Naval Preliminary Evaluation will be conducted in mid-year. The Passive Detection System and both data links will be delivered and integrated in laboratory and flight test aircraft. Tactical software development will continue.

VAST software and hardware development will continue. In FY 1972, the project transitions to production with procurement of 11 aircraft.

Fiscal year 1973 planned program.—Major effort will be completion of the tactical software program and VAST software. The following major milestones are applicable:

First Production Delivery, [deleted].
Board of Inspection and Survey, [deleted].
Fleet Introduction, [deleted].
First Deployment, [deleted].

Program to completion.—Development will be completed in FY 1974, with the wind-up of the Tactical Software Program and VAST software.

Resources: R.D.T. & E., N. funds:	*Dollars in thousands*
Fiscal year 1971 and prior	161,900
Fiscal year 1972	30,910
Fiscal year 1973	14,100
Additional to completion	1,400
Total estimated cost	208,310

E–2C Early Warning Aircraft

Senator Young. Tell us what you plan to do with the $14.1 million you are requesting for this effort for fiscal year 1973.

Dr. Frosch. The major portion of the $14.1 million will be utilized for continuation of the development of the tactical computer program and VAST test program sets. Other requirements include continuation of the laboratory and flight test programs and Navy inhouse funding for monitoring the development effort.

Chairman Ellender. The aircraft procurement request includes funds for the procurement of eight of these aircraft, and 11 were funded in fiscal year 1972. Have all of the major performance requirements for this aircraft been demonstrated through the test program to date?

Dr. Frosch. All scheduled demonstrations of the major performance requirements of the E–2C have been successfully completed during more than 1,000 hours of flight testing including the first formal Navy preliminary evaluation. In every instance performance has been equal to or better than specification requirements. Remaining demonstrations include formal demonstration of the radar [deleted] capability to be completed by [deleted] and demonstration of the passive detection system capabilities to be conducted by [deleted].

Senator Young. I note on page 102 of the descriptive summary that the current estimated cost of this R. & D. effort is $208.3 million. How does this compare to the original estimated cost of the development of this aircraft system?

Dr. Frosch. The original development cost estimate for this program was $133.9 million. Generally speaking, the increase has been caused by capability requirements changes such as addition of the passive detection system and UHF data link, abnormal inflation over that forecast in 1968, and refinement of cost estimates.

Chairman Ellender. As I recall, the E–2C uses the basic airframe developed for the earlier E–2A. Am I correct about this?

Dr. Frosch. Yes, sir.

Senator Young. How many of the E–2A's did we procure?

Dr. Frosch. We procured 59 E–2A's.

Chairman ELLENDER. I note reference to the modifying of these earlier E–2A's to the E–2B configuration. What is involved in that modification?

Dr. FROSCH. This modification consisted of replacing the special purpose, hard wired memory computer with a general purpose, programmable computer. This modification permits greater flexibility in changing the tactical computer program in response to changes in the tactical situation.

Chairman ELLENDER. I have always had the feeling that the E–2A was not a successful airplane. Am I correct about this, and if so, just what were its deficiencies?

Dr. FROSCH. It must be kept in mind that the E–2A was the first aircraft designed and built from the ground up as an AEW aircraft and when this aircraft was designed in the late fifties we were pushing the state of the art in development of automated tactical data systems. Your recollection may be oriented to the early years of operation of the E–2A in the mid 1960's when we experienced many reliability problems in the electronics equipment. Over the years much of the operational impact of these problems has been reduced through modifications and maintenance experience. Nevertheless these aircraft have played and continue to play a vital role in our carrier task force operations. However, our reliability needs cannot be fully satisfied in these E–2A/B aircraft. A significant consideration in the E–2C program has been to profit from the reliability lessons of the E–2A in addition to improving the performance of this weapon system. Reliability goals in the program are being pursued concurrently with performance goals and, we feel, successfully.

S–3A ASW AIRCRAFT

Chairman ELLENDER. The fiscal year 1973 request includes $36,775,000 for the continuation of the development and testing of the new S–3A ASW aircraft. Selected paragraphs from the descrpitive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Category: Operational development—Title: CVS ASW aircraft; Budget activity: 2-aircraft and related equipment.

Description.—Designed to exploit offensive carrier based anti-submarine warfare capability. Capability primarily stems from carrer's mobility, independence from foregn air bases, and ability to concentrate forces at datum beyond economic range of land based aircraft. Replacement for S–2 carrier-based ASW aircraft which will have been in inventory twenty years when first S–3As are deployed. S–3A will be operated to [deleted] at over 400 knots compared to below 10,000 feet, 135 knot capability of S–2. Two high by-pass ratio turbofan engines give S–3A speed and altitude capability plus economical operations at low altitudes required in ASW. Will contain latest ASW sensors. Tactical information from these sensors will be controlled by General Purpose Digital Computer, displayed on multi-purpose displays. Will carry all conventional and nuclear airborne ASW weapons. Carrier group of S–3As will control [deleted] as much ocean as will equivalent number of S–2s.

S–3A development program is progressing extremely well technically. All program milestones to date on or ahead of schedule. Total avionics system undergoing integration at Lockheed Rye Canyon Laboratory. Software development is proceeding in support of laboratory integration and Flying Test Bed. Avionics integration directed toward contractual milestone of Laboratory Demonstration of computer, displays, acoustic processor and associated software. Successful

demonstration required by contractor at least fifteen days prior to Lot III (FY72) production order (4/1/72). This demonstration completed in mid-January and provides specific measure of performance of key avionics subsystem prior to Navy commitment to production.

Work performed by.—Lockheed-California Company, Burbank, California, prime contractor; Vought Aeronautics Division, LTV Aerospace Corporation, Dallas, Texas, major airframe sub-contractor; Univac Division, Sperry-Rand Corporation, St. Paul, Minnesota, computer and software; General Electric Company, Lynn, Massachusetts, GFE engines.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1972 program.—First flight of P–3 avionics flying test bed 27 August 1971, four days ahead of milestone. Avionics flightworthiness, cockpit layout, and system performance demonstrated. First S–3A rolled out 8 November 1971 on schedule. ASW avionics system laboratory demonstration and first flight accomplished mid-January 1972, sixty days earlier than contractually required. Purpose of First Flight is to demonstrate flying qualities prior to production decision for Lot III.

The fiscal year 1972 production buy is for thirteen aircraft. This is minimal lot size to keep production line and to begin development of production skills, at same time minimizing fiscal commitment at this point in program. Also keeps lines going at avionics vendors and assures spares, repair support and field support for important high level R&D demonstration and testing activity during same time period. First four aircraft of this lot are for BIS (Service Acceptance Trials). Any decrease from thirteen aircraft would hazard development program, create subcontractor turmoil and add substantially to production costs.

Fiscal year 1973 planned program.—First full systems flight of S–3A July 1972. Flying qualities and performance NPE (Navy Preliminary Evaluation) by 15 January 1973. Assessment of flying test bed avionics by 15 January 1973. Exercise Lot IV option on or before 1 February 1973.

Program to completion.—Delivery of BIS (Board of Inspection and Survey) configured aircraft 15 October 1973. Initial Fleet Delivery February 1974. Navy Support Date December 1974. Continue production of Lots V and VI. Total estimated production costs to completion now projected at $2413.2M, reflect contract ceiling prices and anticipated impact of continuing high economic levels.

Resources:	*Dollars in thousands*
R.D.T. & E., N. funds:	
Fiscal year 1971 and prior	485,320
Fiscal year 1972	208,388
Fiscal year 1973	36,775
Additional to completion	4,950
Total estimated cost	735,433

S–3A ASW AIRCRAFT

Chairman ELLENDER. Exactly what do you plan to do with the $36,775,000 you are requesting for fiscal year 1973?

Dr. FROSCH. The planned expenditure is as follows:

(1) Billing price amendments (funds contractually required to be paid to Lockheed on delivery of the five R.D.T. & E. aircraft scheduled during fiscal year 1973)—$25 million.

(2) Incentive payment to General Electric due on completion of TF34–GE–2 postendurance tests–$4.7 million.

(3) Engineering changes to the lot I and II (R.D.T. & E.) aircraft—$3 million.

(4) Field station support—$4 million.

Senator YOUNG. I note the current total estimated cost of this R. & D. effort is $735.4 million. What was the original estimated cost of the development of this aircraft?

Dr. FROSCH. The development estimate, as reported in the SAR, was $616.2 million. However, subsequent to that estimate, Congress trans-

ferred $79 million of 1971 PAMN funding for the two lot II aircraft to the R.D.T. & E. appropriation. Therefore the correct development estimate would be $695.2 million.

Chairman ELLENDER. When do we expect this aircraft to become operational with the fleet?

Dr. FROSCH. Fleet introduction of the S–3A is scheduled for February 1974. IOC (initial operational capability) will occur in December 1974, [deleted].

Chairman ELLENDER. On a number of occasions, I have heard this aircraft cited as an example of the fly-before-buy concept. However, the original 13 operational aircraft were funded in 1972, and the pending request includes 42 operational aircraft for 1973, even though such operational performance requirements as loiter speed, maximum continue speed, maximum speed, range enduance, maximum operational altitude, and ordnance have not yet been demonstrated. How can we consider this airplane to be in accord with fly-before-buy concept?

Dr. FROSCH. Prior to exercising the lot IV (42 aircraft) option, three Navy preliminary evaluations of the aircraft will be conducted. The first two of these NPE's are designed to provide preliminary confirmation of those performance parameters you have cited. The third will confirm basic avionics performance. Consequently, prior to exercising the first option for substantial numbers of S–3A's a considerable amount of fly-before-buy testing will have been accomplished.

Senator YOUNG. I note that you expect to have the first full systems flight in July 1972. What do you mean by "first full systems flight"?

Dr. FROSCH. The first two developmental aircraft were purposely not outfitted with a full avionics suite since they are dedicated to flying qualities and performance testing and are heavily instrumented for the conduct of these tests. No. 3 aircraft is the first fully-equipped S–3A, and it will fly on July 17, 1972

DESTROYER HELICOPTER SYSTEM

Chairman ELLENDER. The request includes $20.7 million for the continuation of the development of the destroyer helicopter system, commonly referred to as LAMPS. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Category: Operational development—Title: Destroyers; Budget activity: 2-aircraft and related equipment.

Description.—The Light Airborne Multi-Purpose System (LAMPS) using light helicopter based aboard ship will be able to detect and identify missile firing surface platforms, and missile launches beyond the surface detection capability of parent ship thereby providing additional defensive reaction time. LAMPS will provide for redetection, classification and ASW (Anti-Submarine Warfare) weapons delivery out to destroyer sonar detection ranges of [deleted]. Initially directed toward use of different helicopters, LAMPS effort was redefined in March 1971 toward the program defined below.

LAMPS MK–1 (non R&D) consists of equipping 20 KAMAN SH–2D helicopters with off-the-shelf ASW and ASMD sensors and deploying aboard DLG, DE class ships. Fleet introduction accomplished in Oct. 1971. LAMPS MK–2 (non-R&D) will feature improved helo radar, data link, navigation and communications systems. Fleet introduction in [deleted] last delivery [deleted].

LAMPS MK–3 (R&D) system integration will be accomplished by Navy Laboratories. Contractors will develop separate equipment and sensors. LAMPS air vehicle will be twin-engine helicopter with equipment to accomplish ASW, ASMD (Anti-Ship Missile Defense), surveillance and utility missions. Near term (FY 72–73) development efforts will emphasize attainment of compact, lightweight, more reliable and more effective sensors and equipment for system. Development effort for LAMPS ships will include completion of baseline Combat Information Suite, test and evaluation of a helicopter Hauldown and Single Point securing Device, improvement and testing of aircraft all weather landing and handling facilities and systems integration. These sensors and equipment will update SH–2D as they become available and will form the baseline for the avionics package for a follow-on helicopter and system.

Work performed by: Naval Air Development Center, Warminster, Pa.; Naval Air Engineering Center, Philadelphia, Pa.; Naval Undersea Research and Development Center, San Diego, Calif.; Naval Ship Engineering Center, Hyattsville, Md.; Kaman Aerospace Corp., Bloomfield, Conn. (SH–2D) Modification Program.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—Develop Ship Electronics and Software; Develop Helicopter Avionics and Software; Develop Ship/Aircraft Hauldown and Single Point Securing Device; Commence full LAMPS System Integration; Test equipment individually as avialable. Equipments to be tested include:

a. Light Weight Doppler Navigation System.
b. Improved Magnetic Anomaly Detection (MAD) Processor.
c. [Deleted] Missile Launch Detector [deleted] MLD.
d. Improved Data Link (Aircraft/Ship).
e. Improved Radar (Air/Surface Search).
f. Improved Sonobuoys.
g. Improved Electronic Support Measures (ESM).
h. [Deleted.]

Fiscal year 1973 program.—Continuation of FY 1972 efforts. Specifically, continued development, testing, evaluation and integration of baseline LAMPS suite both ashore and at sea.

4. *Program to completion:* Complete development, testing and evaluation of baseline equipments. Complete integration of LAMPS system and install aboard both aircraft and ships. Conduct technical evaluation and record/report results of total system testing. Completion of full system OPEVAL (Operational Evaluation) by [deleted]. Flight evaluations associated with production phase of LAMPS will continue after [deleted].

FY 1972 Budget as submitted envisioned a total RDT&EN cost of $202.7M which included funds for development of new LAMPS airframe and engines. Current estimate of total RDT&EN costs is $72.5M and does not include new airframe or engine development.

Major Project Milestones to be accomplished:
Commence Total System Development, Jul 1971.
Commence Systems Integration (Full System), Feb 1972.
Complete Full Shipboard Baseline System, [deleted].
Fly Baseline Avionics in D/V 98 Aircraft, [deleted].
Sea Trials Full (Ship and Aircraft) Baseline System, [deleted].
Commence Baseline System Evaluation (OPEVAL), [deleted].
Complete Baseline System Evaluation (OPEVAL), [deleted].

Resources:	*Dollars in thousands*
R.D.T. & E., N. funds:	
Fiscal year 1971 and prior	7,299
Fiscal year 1972	24,800
Fiscal year 1973	20,700
Additional to completion	[deleted]
Total estimated cost	[deleted]

Chairman ELLENDER. I am a little bit confused on the LAMPS program. I have noted reprogramings and requests that include references to LAMPS MK I, LAMPS MK II and LAMPS MK III. Please give a brief description of each of these separate LAMPS programs.

Dr. FROSCH. LAMPS MK I is the system we have in the fleet now. It is simply an existing helicopter modified with off-the-shelf mission equipment. Some ship modifications have also been accomplished. By the end of this year we will have [deleted] LAMPS MK I systems in operation. We plan to eventually modify [deleted] helicopters and [deleted] ships to the MK I configuration. LAMPS MK II is a product improvement over the MK I system. It will feature a better radar, an improved data-linking capability, a strengthening of the helicopter main landing gear, and an improved rotor system which will improve reliability and maintainability and reduce life cycle costs. The MK II still uses existing helicopters and equipment. We will be testing MK II this summer and fall and then plan to proceed into a modification program for [deleted] aircraft and [deleted] ships. The LAMPS MK III will be the resultant of the LAMPS development program. The new mission electronics suits and equipment which are under development for both the ship and helicopter will be fitted to the ships and to a new production aircraft. LAMPS MK III will round out the Destroyer-Helicopter program.

Senator YOUNG. Exactly what will you be doing with the $20.7 million you are requesting for fiscal year 1973?

Dr. FROSCH. The $20.7 million is divided into four categories of effort: $4 million is devoted to the "test bed" and "at sea test" portions of the project. This phase will do feasibility testing on new items of equipment and on new concepts, as well as give us an early look at how well the new destroyer and helicopter system are working together. For prototyping of the new integrated ships tactical system and all weather operating facilities, $2.8 million; in prototyping the helicopter's mission avionics suit, $8.9 million will be spent; and $5 million will be spent in the systems integration area. This effort will provide for the marriage of the ship and helicopter systems, provide for the integrated logistics support planning, and fund the laboratory support and management aspects of the program.

Chairman ELLENDER. Am I to understand that this request for $20.7 million is exclusively for work on the MK III LAMPS system?

Dr. FROSCH. All but $744,000 will be directed specifically for the MK III LAMPS system. This $744,000 will pay for support costs associated with the testing of the LAMPS MK II sensor system. This will be an extensive test program running from July to December 1972. Of course, the results of this testing can be expected to influence decisions made in the MK III LAMPS development effort.

Senator YOUNG. Does this effort involve the development of a new helicopter or merely the modification and reequipping of an existing helicopter?

Dr. FROSCH. The current MK III LAMPS program does not include the development of a new helicopter. The effort is directed at attainment of compact, lightweight, more reliable and more effective sensors and equipment for the system. We intend at a later date to make a selection from several helicopter candidates which are in existence now. We expect that there will be modifications required to optimize the helicopter for LAMPS operations. The equipment will be that developed in the development program.

Chairman ELLENDER. Generally speaking, what additional capabilities will this system give the ships on which it will be deployed?

Dr. FROSCH. The helicopter will provide several capabilities which the destroyer did not possess before. It will be able to redetect, localize and attack submarines out to about [deleted] from the ship. It will provide a surveillance capability out to about [deleted] and will target the ship's missiles to that range. Without the helicopter the destroyer would be limited to about [deleted] for antisubmarine attack and to about [deleted] for surveillance and missile targeting. These are the contributions of major significance. There are, of course, other less prominent benefits to the ship that will accrue.

Senator YOUNG. What types of ships do you plan to deploy this helicopter system on?

Dr. FROSCH. The Navy has plans to use LAMPS on destroyer escorts (DE and DEG), destroyers (DD), guided missile frigates (DLG) and the new patrol frigate class ships.

Chairman ELLENDER. Is the LAMPS system in any way related to the old drone helicopter system we referred to as the DASH?

Dr. FROSCH. You can find a relationship between DASH and LAMPS in that we are applying some lessons learned in DASH to LAMPS, both these systems are in the category of small ship aircraft programs. However, LAMPS is a manned vehicle with much greater capability both in range and sensor performance.

AIRCRAFT OPERATIONAL SYSTEMS

Chairman ELLENDER. Of the total requested for aircraft and related equipment, $5.1 million is requested for a program entitled "Aircraft systems (operational systems), aircraft flight test general." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Operational Development

Title: Aircraft Systems (Operational Systems)

Budget Activity: 2-Aircraft and Related Equipment

BACKGROUND: To provide for flight test and related engineering work associated with determining whether aircraft weapon systems, developed under contract, comply with contract guarantees and specifications, and whether the aircraft weapon systems, components and related equipment are suitable for service use.

DESCRIPTION: This program is accomplished through, but is not limited to, witnessing of contractor demonstrations, and conducting Navy Preliminary Evaluations (NPEs), Navy Technical Evaluations (NTEs), and Board of Inspection and Survey (BIS) Service Acceptance Trials.

WORK PERFORMED BY: Naval Air Test Center, Patuxent River, Maryland.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAM:

Fiscal Year 1972 Program: This is a continuing project covering the flight testing and related support of weapon system improvements, contractor demonstrations, Navy Preliminary Evaluations and supporting the Board of Inspection and Survey service acceptance trials plus Arresting/Catapulting Gear maintenance, Test Pilot School Support. Aircraft system scheduled to commence and/or continue include the following models: A-7E, A-4M, AV-8A, A-6A/B/E, EA-6B, HH-2D, SH-3A, AH-1J, C-130, C-121 and TA-4F.

Fiscal Year 1973 Planned Program: This is a continuing program and the level of effort will increase due to the increasing sophistication and complication of weapon systems and components. Aircraft systems scheduled to commence and/or continue include the following models: A-7E, A-4F/M, P-3C and AV-8A, plus funds for the Test Pilot School, Catapult and Arresting Gear operation and special Flight Test Instrumentation Pool. In addition, component evaluation will include update SHOEHORN installations, AIMS evaluation of all aircraft.

Program to Completion: This is a continuing program to provide broad support to the development of Naval Aircraft Weapons Systems.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	4,180	4,575	5,125	Continuing	Continuing

1100

AIRCRAFT OPERATIONAL SYSTEMS

Chairman ELLENDER. Describe briefly what the purpose of this program is.

Dr. FROSCH. This program includes witnessing of contractor demonstrations, and conducting Navy Preliminary Evaluations (NPE's), Navy Technical Evaluations (NTE's), and Board of Inspection and Survey (BIS) Service Acceptance Trials.

Chairman ELLENDER. Where are these Navy test programs carried out?

Dr. FROSCH. The test programs are carried out at the Naval Air Test Center, Patuxent River, Md.

Chairman ELLENDER. Why do you need the increase of $550,000 you are requesting for fiscal year 1973?

Dr. FROSCH. The increase is due to the increasing sophistication and complication of weapon systems and components.

AIRCRAFT PROPULSION (OPERATIONAL) SYSTEMS

Chairman ELLENDER. For fiscal year 1973, $4.2 million is requested for the program entitled "Aircraft Propulsion (Operational Systems)". Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Operational Development

Title: Aircraft Propulsion (Operational System)

Budget Activity: 2-Aircraft and Related Equipment

BACKGROUND: This project provides test and evaluation of propulsion equipment approved for production and service use.

DESCRIPTION: This program is of continuing nature, conducted at the Naval Air Propulsion Test Center for the test and evaluation of gas turbine engines, propellers and accessories approved for production and service. Examples of effort are evaluation of engine specification performance, air start capabilities and inlet distortion tolerance of aircraft engines and accessories. Certain qualification tests are conducted when the manufacturer does not have suitable facilities for these tests. Testing is also conducted on service fuels and lubricants to assure maximum performance and cleanliness, to evaluate new suppliers of fuels and lubricants, and evaluate new lubricants to improve engine and transmission maintenance and overhaul time.

FY 1972 Program: Complete TF30-P-412 (F-14A) Altitude Qualification Test, High-Low Temperature Qualification Test, Sea Level Performance and Water Ingestion Test and Rocker Exhaust Gas Tests on the TF30-P-412. Continue the fuels and oils, auxiliary power plants, starters and starter valves and engine specification coordination effort. Update and re-issue the Engine Characteristics Summary.

FY 1973 Planned Program:

a. Start TF34-GE-2 (S-3 aircraft) endurance, altitude verification and high-low temperature starting verification tests.

b. Initiate design, fabrication, procurement and installation of equipment required for the start of the F401-P-400 (F14 aircraft) sea level and altitude performance, sea level and low temperature starting, inlet distortion and turbulence effects testing. Initiate calibration of inlet and turbulence screens.

c. Continue fuels and oils effort; contaminated fuel testing on fluid systems on new or modified fuel systems to insure compliance with specification requirements; and evaluation and verification tests on auxiliary power units, starters, etc.

d. Provide a uniform specification for turboshaft, turboprop, turbojet and turbofan engines incorporating the data gained for the various corrosion, erosion, noise, anti-icing, infrared and missile ingestion tests.

e. Continue to update and revise the Engine Characteristics Summary.

Program to Completion: The program is of a continuing nature, keyed to new developments in aircraft engines, components and accessories. Testing and standardization are essential to meeting weapons system milestones, and insure safe operation of fleet equipment.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	4,680	4,580	4,180	Continuing	Continuing

Chairman ELLENDER. I note that the entire amount requested for this program is for a project entitled "Aircraft propulsion evaluation general". Describe for us briefly the purpose of this project.

Dr. FROSCH. I will be glad to do so. The purpose of this project is to test and evaluate propulsion equipment that is approved for production and service use. The program is of a continuing nature, conducted by the Naval Air Propulsion Test Center. Environmental qualification tests are conducted on equipment whenever the manufacturer does not have suitable facilities to conduct the required tests. Testing is conducted on service fuels and lubricants to assure maximum performance and cleanliness, to evaluate new suppliers of fuels and lubricants. Also, included in this project is the updating of engine and component specifications to meet new developments in engine technology.

Senator YOUNG. I note that your request for this project for fiscal year 1973 is $400,000 less than the funds provided for fiscal year 1972. Please comment on the cause for this decrease.

Dr. FROSCH. Yes, sir; the fiscal year 1972 funding requirement includes a comprehensive program for evaluating the TF30–P–412 engine used in the F–14A aircraft. Most of the F–14A engine testing is scheduled for fiscal year 1972. The expensive type testing associated with afterburning engines is excluded from the fiscal year 1973 program. This accounts for a slight decrease in the fiscal year 1973 funding requirements as compared to fiscal year 1972.

AIR ELECTRONIC WARFARE (OPERATIONAL SYSTEMS)

Chairman ELLENDER. Of the total requested for aircraft and related equipment, $9 million is for the program entitled "Air electronic warfare (operational systems)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Category: Operational development—Title: Air electronic warfare (OP SYS); Budget activity: 2-aircraft and related equipment.

Background.—The EA–6B Weapon System is designed to jam enemy radars associated with Anti-Aircraft Artillery (AAA), Surface to Air Missile (SAM), early warning, ground control intercept and acquisition intercept aircraft, and related radio data links and voice communications networks. It will support carrier and advanced base strike aircraft operating in a dense, radar controlled, anti-aircraft environment. The EA–6B will replace the EA–1F, EF–10B and EKA–3B. It is intended to have the inherent flexibility and the growth potential to maintain a significant advantage well into the 1980's.

Description.—Under Project W33–17, the EA–6B aircraft was developed to counter Electronic Warfare (EW) threats [deleted]. Continuation of development under Project W33–57 will provide: coverage of threats [deleted] modification of two developmental EA–6B aircraft and the Systems Integration Test Station (SITS) and conduct of laboratory and flight tests of expanded capability hardware. Means to counter future EW threats will be developed under this program.

Work performed by.—Grumman Aerospace Corporation, Long Island, New York; Airborne Instrument Laboratory, Long Island, New York; Raytheon Corporation, Santa Barbara, California; International Business Machines, Owego, New York; and UNIVAC Corporation, Salt Lake City, Utah.

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PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Design of aircraft wiring, installation, interface and software [deleted] including analog/digital recorders, exciters and additional computer memory; and source selection [deleted] Traveling. Wave Tubes and Transmitters. All Fiscal Year 1971 Program effort was pursued under the EA–6B Project W3317 and Program Element 25602N.

Fiscal year 1972 program.—Complete basic EA–6B Operational Evaluation (OPEVAL). Complete development of additional computer memory, analog and digital recorders, transmitters/exciters [deleted] and modification of two test bed aircraft and the Systems Integration Test Station (SITS) for conduct of development tests. Commence system integration and flight tests. Production incorporation of the expanded capability will be made in January 1973 and subsequent aircraft and retrofitted into aircraft during rework.

Fiscal year 1973 planned program.—Complete systems integration and flight tests. Conduct Navy Preliminary Evaluation (NPE). Conduct Technical Evaluation (TECHEVAL) and commence Operational Evaluation (OPEVAL). Refine developmental hardware to incorporate latest techniques of threat radar countermeasures.

Program to completion.—Complete Operational Evaluation of EA–6B. Continue development of techniques to adapt the Tactical Jamming System for more effective counter response against the latest refinements in threat radar technology. It is axiomatic that R&D and modifications to EA–6B continue for its life to keep the system viable in a dynamic electronic environment.

Resources:

R.D.T. & E., N. funds:	*Dollars in thousands*
Fiscal year 1971 and prior	0
Fiscal year 1972	15,000
Fiscal year 1973	9,030
Additional to completion	29,000
Total estimated cost	53,030

AIR ELECTRONIC WARFARE (OPERATIONAL SYSTEMS)

Chairman ELLENDER. I note that the entire amount requested for this program is for the project entitled "Electronic warfare counter response." Can you give us a brief, unclassified description of this project?

Dr. FROSCH. Under the electronic warfare counter response project the Navy will design, develop, test, and evaluate tactical jamming equipment for the EA–6B to provide effective counter-response against latest refinements in enemy radar technology.

Senator YOUNG. I note in the descriptive summary that, while your request for funds has decreased by some $6 million between fiscal years 1972 and 1973, the man-years associated with this effort have increased from six in fiscal year 1972 to 39 in fiscal year 1973. Would you comment on this, please?

Dr. FROSCH. The man-years associated with this effort have increased with the shift from design engineering and material procurement to laboratory integration and testing and flight evaluation.

Chairman ELLENDER. For fiscal year 1972, $15 million was provided for this project, and for fiscal year 1973, you are requesting only $9 million. What has happened to cause such a large reduction?

Dr. FROSCH. The $15 million in fiscal year 1972 was for expansion of the EA–6B onboard system and tactical jamming pods, including traveling wave tubes, [deleted]. The amount included funds for procurement of developmental hardware. The $9 million in fiscal year 1973 is for continuation of this developmental effort and includes integration and flight test of the system components.

ADVANCED AIRCRAFT PROPULSION

Chairman ELLENDER. Of the total requested for aircraft and related equipment, $10.2 million is requested for the program entitled "Aircraft Propulsion (Advanced)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Category: Advanced development—Title: Aircraft propulsion (Advanced); Budget activity: 2-Aircraft and related equipment

Description.—W4566—Advanced Propulsion for Vertical/Short Takeoff Landing (V/STOL) Aircraft. Component development and preliminary engine design will be conducted during the first two years to substantiate critical technology levels and performance goals. [Deleted.] This program will define the technology and the detailed parameters which will be incorporated in the downstream technology demonstrator engines. It is intended that one or more demonstrator engines be constructed and evaluated starting in Fiscal Year 1974.

W4555—Propulsion Component Technology. This program will fabricate high-temperature flight-weight demonstrator powerplant components, which will then be tested to prove the concept [deleted]. Successful completion of the program will provide engines significantly reduced in length [deleted] volume [deleted] and weight [deleted].

W4565—Fully Modulated In-Flight Thrust Control System. Fabrication, installation and evaluation of a fully-modulated in-flight thrust control system will be accomplished using an F–11 aircraft. [Deleted.] Objective is to investigate and demonstrate advantages, effectiveness and feasibility in the carrier approach, air-to-ground attack, air-to-air maneuverability, and short field landing operational flight regimes of in-flight, fully modulated thrust reverse control for tactical aircraft.

Work performed by.—W4566—Advanced Propulsion for Vertical/Short Takeoff Landing (V/STOL) Aircraft. Potential candidate contractors include, but are not limited to:

Engine—Pratt and Whitney Aircraft, Hartford, Connecticut; and West Palm Beach, Florida; General Electric, Evendale, Ohio; Allison Division, General Motors Corporation, Indianapolis, Indiana; Teledyne/CAE, Toledo, Ohio.

Accessories—Various manufacturers in either prime or sub-contract role.

Navy in-house facilities—Naval Air Propulsion Test Center, Trenton, New Jersey; Naval Air Development Center, Warminster, Pennsylvania; Naval Weapons Center, China Lake, California.

W4555—Propulsion Component Technology. Candidate contractors include, but are not limited to:

Engine—Pratt and Whitney Aircraft, Hartford, Connecticut; and West Palm Beach, Florida; General Electric, Evendale, Ohio; Allison Division, General Motors Corporation, Indianapolis, Indiana; Teledyne/CAE, Toledo, Ohio.

Accessories—Various manufacturers in either prime or Sub-contract role.

In addition, support will be provided by: Naval Air Propulsion Test Center, Trenton, New Jersey; Naval Air Development Center, Warminster, Pennsylvania; and the Naval Weapons Center, China Lake, California.

W4565—Fully Modulated In-Flight Thrust Control System. ROHR Corporation, Chula Vista, California; Grumman, Bethpage, Long Island, New York; Naval Air Test Center, Patuxent River, Maryland; Naval Air Systems Command, Washington, District of Columbia.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—W4566—Advanced Propulsion for V/STOL Aircraft. This program is a "new initiative". During Fiscal Year 1972, engine component technology development and design and integration analyses will be initiated.

W4555—Propulsion Component Technology. During Fiscal Year 1972, development of full-scale high temperature technology components will be initiated. Support development of variable area turbine technology.

W4565—Fully Modulated In-Flight Thrust Control System. Fabrication of flight-weight thrust reverser system will be initiated for installation on F–11 test aircraft. Fabrication and installation funding requirements are covered by Fiscal Year 1973 as well as Fiscal Year 1972 program funds.

Fiscal year 1973 planned program.—W4566—Advanced Propulsion for Vertical/Short Takeoff Landing (V/STOL) Aircraft. During Fiscal Year 1973, it is planned to have the component technology and aircraft/engine design and integration sub-programs completed. Full scale engine development will be initiated.

W4555—Propulsion Component Technology. Variable area turbine programs will be completed. Construction of Airborne engine condition analysis system will be initiated. Designs of an austere Maximum Temperature Engine, incorporating Air Force Advanced Turbine Engine Gas Generator (ATECG) technology, will be undertaken.

W4665—Fully Modulated In-Flight Thrust Control System. Complete installation of thrust reverser mechanism.

Program to completion.—W4566—Advanced Propulsion for V/STOL Aircraft. [Deleted]. Technology then available will be incorporated into Engineering Development propulsion systems for planned Naval tactical aircraft systems.

W4555—Propulsion Component Technology. Full scale engine development, on a joint basis, will be completed in Fiscal Year 1975. Technology obtained from this program will be incorporated into the Advanced Propulsion for V/STOL Aircraft Advanced Development program, as applicable. The engine technology developed will be closely coordinated with Air Force ATEGG and Aircraft Powerplant Subsystem Integration (APSI) programs.

W4565—Fully Modulated In-Flight Thrust Control System. Completed.

Resources:	*Dollars in thousands*
R.D.T. & E. funds:	
Fiscal year 1971	0
Fiscal Year 1972	7,115
Fiscal Year 1973	10,196
Additional to completion	Continuing
Total estimated cost	Not Applicable

ADVANCED AIRCRAFT PROPULSION

Chairman ELLENDER. From the descriptive summary, it would appear that the three projects funded under this program were begun in the exploratory development category in fiscal year 1971, and were moved into the advanced development category in fiscal year 1972. Am I correct?

Dr. FROSCH. Fiscal year 1972 is the first year that the Navy has a funded advanced development program in the area of advanced propulsion for aircraft. The specific projects which you mention have had anywhere from 3 to 5 years to prior exploratory development support. During this time, it was possible to perform initial test programs to verify the concepts and to gain assurances relative to their probability of success after transition to advanced development.

Senator YOUNG. Of the $10.2 million requested for aircraft propulsion, $1.4 million is for a project entitled "Propulsion component technology". Would you describe this project briefly and and tell us what your plan includes for fiscal year 1973?

Dr. FROSCH. The propulsion technology project is intended to develop advanced engine components, particularly in the high temperature technology area, for broad application to advanced propulsion systems. Under this project, starting in fiscal year 1972 and continuing for a period of 36 months, a full-scale, flight-weight high-temperature variable-area turbine will be developed and carried through an initial test program. [Deleted.] This is a turbine which will operate at temperatures [deleted] higher and at a work level [deleted] greater than current engine values, and which can be attained with moderate ad-

vances in technology. The program is fully coordinated with the Air Force, and the turbine being developed will be in a size such that it can be operated on the Air Force ATEGG (advanced turbine engine gas generator) engines, thereby obtaining maximum joint benefits while eliminating the need for building additional running powerplants.

Chairman ELLENDER. Of the total requested for aircraft propulsion, $400,000 is for a project entitled "Inflight fully modulated thrust reverser control system". Would you describe this project briefly and tell us what you hope to accomplish in fiscal year 1973?

Dr. FROSCH. The project itself involves development and inflight checkout of a fully modulatable, inflight deployable thrust control system to improve operational agility of military combat aircraft. The system is very similar to those installed on commercial aircraft except that it is capable of being deployed while in flight and is infinitely positionable at the same time. During fiscal year 1973, it is planned to complete design, development, fabrication, and checkout of the thrust reverser system on the F–11 aircraft which the Navy has made available for this purpose. Checkout of the system involves static testing of the unit by contractor personnel prior to initiation of formal flight testing by Navy test pilots.

Chairman ELLENDER. Of the total requested for aircraft propulsion, $8.4 million is for the project entitled "Advanced propulsion for V/STOL aircraft." I note in the descriptive summary under the heading "fiscal year 1971 and prior accomplishments" that this project is listed as having been in the exploratory development category. Under the heading "Fiscal year 1972 program," it is stated that the project was a new initiative in fiscal year 1972. Would you explain this apparent discrepancy?

Dr. FROSCH. In fiscal year 1971, and in the year prior, there was no work being performed in advanced development in the area of V/STOL propulsion. Such work was being performed in V/STOL technology was done in exploratory development. That is why the fiscal year 1971 and prior accomplishments line reads as it does. In November 1970, when the sea control ship concept was proposed, a detailed review of the supporting areas for a V/STOL aircraft was made—one of these being propulsion. It was recognized that much technology was available but that a shot in the arm was needed to bring this technology to bear in the area of advanced propulsion systems for V/STOL aircraft, particularly in light of the unique operational requirements to which such a powerplant is subjected. It was decided to establish a new project (i.e., new initiative) to support this area, starting in fiscal year 1972.

Senator YOUNG. Would you describe for us briefly what you accomplished in fiscal year 1972 on this propulsion system for the V/STOL aircraft?

Dr. FROSCH. The program did not get underway until after the midpoint of the fiscal year, in order to insure that the Navy's plan was jointly coordinated with the Air Force, to obtain maximum utilization of funds and maximum benefits from the resultant technology. Responses to RFQ's (request for quotations) are expected shortly, and contracts will be initiated in fiscal year 1972. These contracts will be for critical component technology in support of advanced V/STOL propulsion systems, and for preliminary design of an advanced di-

rect lift engine, to support V/STOL in general and the Navy's prototyping program in particular.

Chairman ELLENDER. Please describe what you hope to accomplish in fiscal year 1973.

Dr. FROSCH. In fiscal year 1973, it is expected that the following will be accomplished:

1. The component technology program will continue, with the fabrication of the selected components initiated and possibly completed, and some endeavors in testing of the components.

2. The preliminary design of the lift engine will be completed, and one contractor will be selected to carry the lift engine program through development and testing.

3. Preliminary design analyses will be made of several advanced thrust vectoring nozzle systems suitable for direct application to current advanced technology cruise powerplants. These vectoring systems will allow cruise engines to be used to give lift capability, resulting in what is known as a lift-cruise engine.

Chairman ELLENDER. Why do you need the rather large increase of $2.8 million you are requesting for this program for fiscal year 1973?

Dr. FROSCH. The additional funding is required to allow initiation of the full-scale lift engine development.

ADVANCED AVIONICS

Chairman ELLENDER. Of the total requested for aircraft and related equipment, $3.6 million is requested for the program entitled "Advanced Avionics." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

AVIONICS (ADVANCED)

Description.—This program element consists of four projects dedicated to increasing the tactical capability of the operating forces through improving weapons systems capabilities.

W1118—Air to Surface Target Acquisition. Provides for transition of promising exploratory development efforts into hardware for evaluation. Presently the principal tasks are high resolution, multi-mission radar development using real-time digital synthetic aperture processing, laser development with Forward Looking Infrared (FLIR) integration to provide active/passive night operable system having superior performance in detection range to conventional FLIR equipments and development of electro-optical telescope for airborne identification of ground targets at several times unaided eye range. [Deleted.]

W1119—Airborne Bombing Equipment. Develops system components for improvement of Airborne Bombing Equipment. All tasks presently radar oriented, consisting of (1) phased array antenna developments; (2) the High Resolution Multiple Application Radar (HIMAR) radar development having short pulse range resolution and azimuth correlation; (3) flight evaluation of completely [Deleted] Task (1) directed to accomplishment of all required attack radar functions [Deleted.] Electronically scanned fixed array has flexibility for providing all required simultaneous modes and would be used for future attack aircraft design. Task (2) directed to improving [Deleted]. Task (3) [Deleted] showing remarkable capability for separating targets from unwanted clutter. [Deleted.]

W1620—Radar Technology Target Recognition through Integral Spectral Analysis Techniques (TRISAT). Project objective is to develop non-cooperative radar spectrum analysis techniques to distinguish enemy aircraft [Deleted]. This equipment should provide subsystem capable of ready interface

with fighter/interceptor aircraft [deleted]. Development approach uses [deleted] as a source of target signature. Comparison of the [deleted].

W3515—Carrier Aircraft Inertial Navigation System (CAINS). Project objective is to develop rapid reaction, data link aligned inertial navigation system capable of providing precise aircraft position, attitude and motion information. Aircraft equipment is designated AN/ASN–92(V) and is designed to operate with compatible suite of shipboard equipment, an Inertial Platform Test Set (IPTS), Versatile Avionic Ship Test System (VAST), and aircraft data link system. CAINS will provide automatic alignment of inertial platform in [deleted] utilizing ship's motion signals received via data link without the operational restrictions imposed by attachment of cables to aircraft. CAINS project is on schedule and will meet scheduled introduction of user aircraft (F–14A, E–2C and S–3A).

Work performed by:

Naval Air Development Center, Warmister, Pa.
Naval Research Laboratory, Washington, D.C.
Naval Weapons Center, China Lake, Calif.
Hughes Aircraft Company, Culver City, Calif.
Westinghouse Electric Corporation, Baltimore, Md.
United Aircraft Research Laboratories, East Hartford, Conn.
Naval Air Test Center, Patuxent River, Md.
SCOPE Incorporated, Alexandria, Va.
Raytheon Company, Bedford, Mass.
Litton Systems Incorporated, Woodland Hills, Calif.
Grumman Aerospace, Bethpage, N.Y.
Naval Avionics Facility, Indianapolis, Ind.
Maxson Electronics Company, Great River, N.Y.
Autonetics Division, North American Rockwell Corporation, Los Angeles, Calif.
Syracuse University Research Laboratory, Syracuse, N.Y.

Fiscal year 1972 program.—W1118—Air to Surface Target Acquisition. Flight testing of Westinghouse high resolution radar in ground modes will be continued until reasonable library of date suitable for evaluation in Naval Research Laboratory cockpit simulator obtained. System improvements for increasing processor dynamic range, providing for perturbed flight operations, spotlight mode tracking and improved display and recording will be introduced and evaluated. Naval Research Laboratory operations to evaluate imagery in real time target recognition and designation sense will be continued, to assess operator factor in tactical aircraft. Naval Weapons Center will begin construction of CO_2 laser [deleted] based on cross flow design or earlier lower power device. This laser will be article to be integrated with advanced Forward Looking Infrared (FLIR) for final demonstration of active-passive system performance. If possible preliminary closed cycle, high flow laser design and laboratory article will be procured from United Aircraft Research Labs to speed up the project. The electro-optical telescope will be flight tested in podded configuration [deleted]. Cooperatively funded digital processor designed by Hughes to replace storage tube devices in first generation multi-mission radar will be system integrated and flight evaluated.

W1119—Airborne Bombing Equipment. High Resolution Multiple Application Radar (HIMAR) project will be completed and delivered for flight evaluation. Phased array antenna integration with parent radar, laboratory evaluation, installation in flight vehicle and start of evaluation to determine mode interfacing operational problems will be accomplished. [Flight evaluation [deleted] will be completed.]

W1620—Radar Technology Target Recognition through Integral Spectral Analysis Techniques (TRISAT). Synthetic signature generation verification will continue. [Deleted.]

W3515—Carrier Aircraft Inertial Navigation System (CAINS). Completion of AN/ASN–92(V) Design Approval Tests and incorporation of design changes required to establish a final configuration. Verify achievement of performance goals. Contract for ship's data link transmitter system. Evaluate prototype modifications to Ship's Inertial Navigation System (SINS) for improved alignment signals. Completion of Inertial Platform Test Set (IPTS) development scheduled for April 1972.

Fiscal year 1973 planned program.—W1118—Air to Surface Target Acquisition. Increase in program scope for Fiscal Year 1973 is attributable to start of two new developments which will be sufficiently advanced in exploratory work

to warrant transition to category III. These are initial step to prepare [deleted] multi-mode radar antenna of sufficient number of modules to test that concept and initial installment on development of forward looking infrared system optimally matched to pilot-operated requirements for night operations. Improvement of current Westinghouse high resolution radar will continue with introduction of processor changes to simplify hardware and perhaps to add capability for better derivation of ground speed—an important factor in high quality synthetic aperture processing. Naval Weapons Center laser will be completed and integration with purchased Forward Looking Infrared (FLIR) having common optics undertaken. This combination can be ground evaluated and preparation for air evaluation started. Optical-telescope air evaluation should be complete. A task to shrink package to 8–9 inch diameter while maintaining magnification and gimbal freedom for air to air and air to surface useage will be started.

W1119—*Airborne Bombing Equipment.* Fiscal Year 1971 project reduced to permit spin off of Angle Rate Bombing concept into separate project status. Project terminated in Fiscal Year 1972. Two major flight evaluations require support in Fiscal Year 1973. First is laser illuminator and receiver package with minimum weight, minimum cost radar design especially suited to pilot only operation and aimed at light weight avionics requirements of Vertical/Short Take Off Landing (V/STOL) type aircraft but having potential application to other vehicles. Laser package would provide single aircraft operation with guided bombs, spot tracing for conventional delivery and would combine in attachable package all optical detection and tracking capability normally associated with several separate systems. Second effort would provide complete, modern technology phased array radar with all modern detection and tracking techniques. Such a radar is likely candidate for any future crew-operated attack aircraft of Conventional Takeoff and Landing (CTOL) design.

W1620—Radar Technology Target Recognition through Integral Spectral Analysis Techniques (TRISAT). Those efforts ongoing in Fiscal Year 1972 will be supported in Fiscal Year 1973.

W3515—Carrier Aircraft Inertial Navigation System (CAINS). Development of modifications to Ship's Inertial Navigation System (SINS) to provide improved quality and resolution of ship's motion parameters for CAINS alignment. The CAINS Operational Evaluation will be conducted. Project complete.

Program to Completion:

W1118—Air to Surface Target Acquisition. Projection for laser/FLIR work is completion Fiscal Year 1975. Electro-optical telescope work will continue through 1974, solid state radar work is beginning and will be ongoing [deleted].

W1119—Airborne Bombing Equipment. Tasks have varying completion schedules. New tasks are multi-year undertakings at expected funding levels. Estimated that laser/radar package four year development and array radar approximately five years to completion.

W1620—Radar Technology TRISAT. Develop track-while-scan and [deleted] capability. [Deleted.] Provide plan for integration with future developments in weapon systems.

Resources (in thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, 6,036; fiscal year 1972, 5,945; fiscal year 1973, 3,557; additional funds to completion are continuing; and the total estimated cost is not applicable.

ADVANCED AVIONICS

Chairman ELLENDER. According to the justifications, the funds requested for each of the four projects funded under this program are less than the amounts provided for fiscal year 1972. However, in the case of the project entitled "Carrier Aircraft Inertial Navigation System," the decrease is from $1.3 million in fiscal year 1972 to a request of $467,000 in fiscal year 1973. Does this indicate that you plan to complete this project in fiscal year 1973?

Dr. FROSCH. Yes, sir.

ADVANCED AIR ANTISUBMARINE WARFARE

Chairman ELLENDER. For fiscal year 1973, you are requesting funds for the program entitled "Advanced Air Antisubmarine Warfare." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

AIR ASW (ADVANCED)

Description.—This program consists of three budgeted projects for FY 1973. Prior year fundings have been providing ASW aircraft with improved or advanced detection and localization systems capable of combating high speed, quieter, deep-diving submarines. Project W21–40, Advanced Acoustic Search Sensors, is budgeted over $3 Million for FY 1973 and is fully discussed in a separate summary.

1. Project: *W21–40 Advanced Acoustic Search Sensors.* This project will develop the acoustic detection systems needed to cope with the quiet submarine threat projected into the 1980's. Major development efforts are: [Deleted].

2. Project: *W21–44 Acoustic Deception Devices (ADDS).* [Deleted.]

3. Project: *W21–41 Carrier Tactical Support Center (CVTSC).* The CVTSC will support carrier-based air ASW operations by providing a means for rapid mission analysis, in-flight support and post-flight reconstruction. The TSC interfaces with the command and control system by providing tactically significant information for a force commander's use.

Work performed by.—Project W21–40: Naval Air Development Center, Warminster, Pa.; Naval Ordnance Laboratory, White Oak, Md.; Naval Undersea Research and Development Center, San Diego, Calif. Project W21–41: Naval Air Development Center, Warminster, Pa. and Naval Air Test Center, Patuxent River, Md. Project W21–44: Naval Undersea Research and Development Center, San Diego, Calif., and Naval Air Development Center, Warminster, Pa.

(b) *Project W21–41.* Complete prototype procurement and conduct evaluation [deleted].

(c) *Project W21–44.* Continue development of an air deployable-expendable device for evaluation in FY [deleted] with Initial Operational Capability scheduled for late FY [deleted]. Prior to engineering development start in FY [deleted] a preliminary Navy R&D evaluation of critical component developments will be conducted.

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, 10,151; fiscal year 1972—fiscal year 1973 [deleted]; additional funds to completion are continuing; and the total estimated cost is not available.

Fiscal year 1972 program.—*Project W21–40:* Machine Assisted Detection and Classification advanced development completed in 1972. Feasibility model testing at sea. Continuation of design and fabrication of advanced development models. *Project W21–41:* Preparation of specifications for software and equipment. Procure and evaluate digital TV for displays. *Project W21–44:* Continue feasibility model fabrication and testing at sea.

Fiscal year 1973 planned program:

(a) *Project W21–40:* [Deleted.] Contract for advanced development models, continue software development and laboratory testing.

(b) *Project W21–41:* Procure software application programs. Design interfaces with other shipboard systems. Continue test and evaluation of displays and other equipment. Determine specifications for production equipment.

(c) *Project W21–44:* [Deleted.]

Program to completion:

(a) *Project W21–40:* Transfer individual projects to engineering development.

Senator YOUNG. I note that the project entitled "Destroyer helicopter system, LAMPS" has been transferred from the advanced development category for fiscal year 1973. What category is this project being funded under now?

Dr. FROSCH. LAMPS is now funded under program element 24412N. which is the operational development category we discussed earlier.

Chairman ELLENDER. There has been a dramatic increase in your request for fiscal year 1973 funds for the project entitled "Advanced acoustic search sensors"; $9.8 million was provided for this project in fiscal year 1972, and you are requesting $21.1 million for fiscal year 1973. What has caused the need for this large increase?

Dr. FROSCH. This project involves the development of [deleted] and supporting acoustic design testing. In fiscal year 1972, the work was primarily concerned with critical component development, design studies and the start of the acoustic design test series. In fiscal year 1973, we are beginning the procurement of the first series of full scale development models, we are entering a more intensive component development state and we are conducting much more extensive acoustic design tests at sea.

Senator YOUNG. You are requesting $2.2 million for the project entitled "CV tactical support center". Please describe this project briefly, and tell us why you need the increase of $989,000 you are requesting for fiscal year 1973.

Dr. FROSCH. The carrier tactical support center will provide for more effective utilization of the carrier's ASW assets. It is a data processing, storage and display system, which can rapidly correlate tactical and sensor data for evaluation and presentation to higher command authority. The center will also perform the function of premission crew briefing, inflight support of on station aircraft and post-mission analysis. The fiscal year 1972 obligation authority for the tactical support center was $1.211 million. That was the first year of the project and the effort was in the areas of design analysis and software development. The fiscal year 1973 request is for $2,190,000. With this amount we will continue our design and software efforts at a somewhat increased level of effort and do the first procurement of actual prototype hardware for the system. The hardware engineering costs account for the major portion of the increase.

Chairman ELLENDER. Has the committee been provided with details on the project entitled "Airborne ASW deception devices"?

Dr. FROSCH. Some information was provided earlier.

[Deleted.] In fiscal year 1973 we will begin [deleted]. The expense of both these units will be a primary factor in the development.

ADVANCED AIR ELECTRONIC WARFARE

Chairman ELLENDER. You are requesting funds for projects to be funded under the program element entitled "Advanced air electronic warfare." What is the objective of this program?

Dr. FROSCH. The objective of program element 63255N is to develop airborne electronic warfare systems in the [deleted] frequencies for Navy/Marine tactical fighter and reconnaissance aircraft. The primary emphasis provides for the advanced development of electronic countermeasures techniques and equipments to counter enemy surface-to-air missiles, antiaircraft gunfire and air intercept fire control systems. The program increases the Navy's capability to assure sea control and project our power ashore.

Senator YOUNG. Are you requesting funds for any projects not previously funded?

Dr. FROSCH. Two new projects are being funded in fiscal year 1973 as follows: W3360 tail warning/comm jamming, provides a combined

tail warning radar and communications jammer for self protection of tactical aircraft [deleted]; W3361 superbandwidth/dual mode DECM is being developed to increase the probability of survival of Navy strike aircraft through simultaneous use of both [deleted] techniques.

Chairman ELLENDER. Approximately how much of the total requested is for work to be performed in Navy facilities?

Dr. FROSCH. About one half of the work under this program element is being funded in house.

Chairman ELLENDER. I note in the descriptive summary that the Air Force and the Army are also involved in projects associated with this one. How are these efforts coordinated with those of the Navy?

Dr. FROSCH. A joint electronic warfare panel has been established to review the services electronic warfare programs on a regular basis and develop a joint plan to insure future countermeasure efforts are planned and coordinated among the services. Particular emphasis is placed on recommendations that, to the maximum extent possible, all equipment produced is common, interchangeable and compatible.

OTHER ADVANCED AIR DEVELOPMENTS

Chairman ELLENDER. $1 million is requested for the program entitled "Other advanced air developments." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

OTHER AIR DEVELOPMENT (ADVANCED)

Description.—*W1423 High Speed Helo Rotor.* The objective of the program is to extend efficient operation of helicopters from 150–200 Knots to the 300–400 Knot range with corresponding increases in productivity, combat effectiveness and survivability. Until recently, efforts to provide this capablity have resulted in rather complex hybrid aircraft of questionable value because of extreme complexity. The Reverse Velocity Rotor (RVR) appears to offer a viable technical alternative to the unsatisfactorily complex hybrid aircraft. The RVR utilizes specially designed airfoil sections capable of efficient operation in reverse flow, a unique mechanical system capable of providing higher harmonic feathering (two per revolution), and a system to reduce rotor RPM (Revolutions Per Minute) at high speeds. The RVR has applications for rotary wing aircraft between 15,000 and 40,000 pounds over a speed range of 150 to 400 Knots.

W4558 Advanced Airborne Oxygen System. Aircrew breathing oxygen supply in present operational aircraft is provided by stored liquid oxygen system (LOX). Over 40 percent of LOX is lost during transfer, storage and aircraft converter filling operations. LOX systems demand the continued examination for purity, refill of aircraft converters prior to flight and large amount of carrier space and ground support equipment.

The objective of this project is to provide an oxygen system which will eliminate the limitations and disadvantages inherent with the LOX system. The airborne self-contained oxygen system will separate oxygen from air or water and deliver it to aircrewmen as pure breathing oxygen. The system requires electrical power (0–7 KVA (Kilo Volt Amperes)) and air and/or water (2 pints/15 flight hours). The development will eliminate bulky ground support equipment and space aboard the aircraft carrier (60,000 pounds and 2,300 square feet respectively). Aircraft turn around time with respect to oxygen will be reduced to 0 and the flight duration will be over 1,000 flight hours without maintenance. It also eliminates fire hazard created by the storage of LOX on the hanger deck, and substantial saving will be realized in support equipment, maintenance and logistic costs.

W4559 Helicopter Escape and Survival System. Recent studies of AH–1 Cobra fatalities indicate that an individual in-flight escape system could have prevented approximately 60 percent of the fatalities experienced.

Program objective is to increase capability for personnel survival of helicopter in-flight emergencies by providing: (1) means of escape and controlled descent; (2) protection against impact forces, in-flight and post-crash explosions, fires and projectiles and (3) a sustained land and sea survival capability. The system shall (1) be adaptable with a minimum of tailoring to all types of helicopters; (2) impose minimum weight penalty (not greater than 5 percent gross weight); (3) be effective from minimum initiation altitude of 50 feet up. Two basic system configurations are being investigated: (1) an individual escape system for small, gunship-type helicopters and (2) a capsular system for large, troop-carrying helicopters.

Work performed by:

W1423 High Speed Helicopter Rotor. Prime contractor is Fairchild Industries, Republic Division Farmingdale, L.I., with wind tunnel support by NASA, Ames Research Center, Moffett Field, Calif.

W4558 Advanced Airborne Oxygen System. Principle contractor(s): General Electric Company, Lynn, Mass.; AiResearch Manufacturing Company, Los Angeles, Calif.

In-house Facilities: Naval Air Development Center; Naval Missile Center.

W4559 Helicopter Escape and Survival System.

In-house Facilities:

Naval Air Development Center, Warminster, Pa.
Naval Aerospace Recovery Facility, El Centro, Calif.
Naval Weapons Laboratory, Dahlgren, Va.
Naval Weapons Center, China Lake, Calif.

Contractor Facilities:

Stencel Aero Engineering Corporation, Asheville, N.C.
Boeing-Vertol Company, Morton, Pa.

Program accomplishments and future programs:

Fiscal year 1972 Program:

W1423 High Speed Helicopter Rotor. Fabrication of the 8-foot diameter rotor model and test apparatus will be completed; high Reynolds number, high Mach number tests will be performed in the NASA, Ames 12 foot pressure tunnel and data analyzed to assist in design of full scale rotor. Two dimensional transonic airfoil tests will be conducted of the reversible airfoil.

W4558 Advanced Airborne Oxygen System. Prototype open system and emergency oxygen system will be fabricated and laboratory tests and evaluation will be completed.

W4559 Helicopter Escape and Survival System. (1) Preliminary design, fabrication and testing of retrorocket for integration into recovery system; (2) Continuation of refinements; (3) Complete preliminary design of capsular Severance and Separation system; (4) Continuation of System Engineering and Specialty Studies and (5) Completion of recovery system preliminary development.

Fiscal year 1973 planned program:

W4558 Advanced Airborne Oxygen System. Design and development of open system flight test units will be completed. Flight testing will be initiated. Increased funding over Fiscal Year 1972 level to cover the cost of flight test units, test equipment, facilities and support.

Program to Completion:

W4558 Advanced Airborne Oxygen System. Flight tests will be concluded in Fiscal Year 1974 ending the Advanced Development Program. Procurement Data will be finalized for the support of subsequent engineering development.

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, 1,400; fiscal year 1972, 1,553; fiscal year 1973, 1,030; Additional funds to completion are continuing; and the total estimated cost is not available.

Other Advanced Air Developments

Chairman Ellender. I note that two projects were funded in fiscal year 1972 for which no funds are requested for fiscal year 1973. Did you complete these projects?

Dr. Frosch. No, Mr. Chairman, they have been redirected. The high-speed helo rotor project (W1423) consisted of a single approach, the reverse velocity rotor system. The Naval Ship Research and Development Center, however, has completed preliminary work on an

equally promising high-speed helicopter project, the circulation control helicopter rotor. It is now our intention to look at both of these concepts in fiscal year 1973 in the exploratory development area prior to proceeding further with advanced development.

Senator YOUNG. The entire amount requested for fiscal year 1973 is for the project entitled "Advanced Airborne Oxygen System." Please give the committee a brief description of this project and tell us what you hope to accomplish with the funds you are requestng.

Dr. FROSCH. This joint Navy/Air Force development consists of a small lightwight package or system which will separate oxygen from the air and deliver breathing oxygen to an aircrew. It is equivalent in weight and space to the existing liquid oxygen systems in high performance aircraft, but will completely eliminate the bulky support equipment now required to service such systems. The fiscal year 1973 funds will enable us to complete development of the open loop system flight test units and to commence flight tests of the open loop system.

Chairman ELLENDER. Why do you need the increase of $500,000 you are requesting for fiscal year 1973?

Dr. FROSCH. The increased funding over the fiscal year 1972 level is to cover the cost of flight test units, test equipment, facilities, and support.

V/STOL FOR SEA CONTROL SHIP

Chairman ELLENDER. The next item is a request of $24 million for the development of the V/STOL aircraft for the proposed sea control ship. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

Resources (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971 and prior, 0; fiscal year 1972, 8,000; fiscal year 1973, 24,000; additional funds to completion are undetermined; and the total estimated cost is underdetermined.

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

V/STOL FOR SEA CONTROL SHIP PROTOTYPE (ADVANCED)

Category: *Advanced Development*

Background.—The Navy is embarked on the development of a new class of ships called the Sea Control Ship by which it expects to exploit VSTOL aircraft of various types of carry weapons and sensors to greatly extend the capability of the ship. It is expected that the hull will mount minimal weapons and sensors—dependence for both offensive and defensive action being to a large degree, vested in the aircraft.

Description.—The purpose of this work is to examine the technological opportunities in the VSTOL area for development of advanced capabilities for Sea Control Ship. Two general types of aircraft are expected to be examined: (a) a long endurance, sensor-carrier which may also deliver weapons against low-resistance targets such as submarines and fast patrol boats; (b) a shorter endurance, higher performance, fighter/attack type for air opposition and offensive missions against larger ships.

Work performed by.—Industrial contractors to be selected in early calendar 1972.

Program accomplishments and future programs:

Fiscal year 1972 program.—Contractor will be chosen and work initiated.

Fiscal year 1973 planned program.—Continue work initiated in fiscal year 1972.

Program to completion.—Undetermined.

Chairman ELLENDER. What is the objective of this effort, and how is it related to the proposed sea control ship? As I recall, the shipbuilding

request includes about $116 million for the construction of the first of the planned sea control ships.

Dr. FROSCH. The purpose of the program is to provide technology prototypes of strike-fighter aircraft to be used from the sea control ship.

Senator YOUNG. I note on page 143 of the descriptive summary that $8 million was made available for this program in fiscal year 1972. Is that $8 million to be the subject of a reprograming action?

Dr. FROSCH. Yes. Reprograming action 72–5 has been submitted to the Congress.

Chairman ELLENDER. Specifically, what do you plan to do with this $24 million you are requesting for 1973?

Dr. FROSCH. Based on an average of the funding profile submitted by the industry in their response to the V/STOL prototype letter of interest, $24 million is considered to be the required amount for the fiscal year 1973 effort. This would provide for a detailed design of the proposed aircraft and the commencement of fabrication.

Senator YOUNG. In the event that the $8 million reprograming request for fiscal year 1972 is not approved, what effect will this have on your $24 million request for 1973?

Dr. FROSCH. The amount requested for fiscal year 1973 would then be changed to $32 million in order that the development of the V/STOL prototype might keep pace with the evolution of the sea control ship and the total concept. The at-sea tests using a V/STOL aircraft borrowed from the Marine Corps aboard the U.S.S. *Guam* are proceeding successfully, and are showing that many of the original concerns such as heat, downwash, hot gas reingestion, and the like, are not as serious as originally expected. It would therefore be in the Navy's best interests to proceed with deliberate speed with the V/STOL prototype to be developed for the sea control ship.

AIRCRAFT ENGINEERING SYSTEMS

Chairman ELLENDER. $14 million is requested for a program entitled "Aircraft systems (engineering)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E Descriptive Summary

Category: Engineering Development

Title: Aircraft Systems (Engineering)

Budget Activity: 2-Aircraft and Related Equipment

BACKGROUND:

W1425 - CH-53E. Congress appropriated funds, $2M in Fiscal Year 1970 and $10M in Fiscal Year 1971, for the development of an 18 ton payload heavy lift helicopter. Department of Defense later approved one Heavy Lift Helicopter (HLH) development program for all services with United States Army as lead service and concurrently identified a program"to develop a smaller shipboard based helicopter by upgrading the current CH-53D" for Marine Corps and Navy use. In conjunction with this decision, the United States Navy transferred funds to the United States Army as its contribution to the Joint development of the land based HLH components. The CH-53E is needed to provide increased lift and improved capability to United States Marine Corps assault force and for logistic and tactical purposes.

W11X8 - VCX. A replacement aircraft for the C-2A is required to fulfill the Navy's continuing need for rapid response delivery of cargo/personnel/MEDEVAC to and from the carrier at sea. This requirement is expected to continue and probably increase as cost of spares and pipeline length increase due to the reduction of programmed spares resulting from reductions in the national defense budget.

The capabilities of the present Carrier Onboard Delivery (COD) aircraft, as well as the total number, are only marginally satisfactory in fulfilling peacetime tempo of operations. Contingency operations require additional forces. Adequate support of a carrier group requires a minimum of 9,165 pounds of priority cargo plus eight passengers per day. During actual operations on Yankee Station, 10,549 pounds of cargo plus ten passengers were delivered to each carrier group per day. Even the modest level of support cited above requires at least 30 C-2A aircraft to meet the needs of a representative number of five carriers operating at an average radius of 1,200 miles from resupply bases. Currently, only 14 C-2A plus obsolete C-1A aircraft are in the inventory to meet these requirements. Production of the C-2A was terminated in December 1967 and current inventory C-2A's will start reaching the over-age category in 1975.

United States withdrawal from overseas bases and reduction in number of ships will require aircraft carrier forces to operate at increasing distances from support bases with greater time on station. Effectiveness of these forces requires resupply of high cost, high priority material to support the systems installed in these ships and aircraft. In order to obviate the requirement to carry a large inventory of costly and space consuming spares aboard each carrier, an efficient force of COD aircraft with improved range and speed capabilities is required.

DESCRIPTION:

W1425 - CH-53E. The CH-53E Program will develop a shipboard compatible helicopter configured for the lift and movement of cargo and troops/passengers internally, the tactical recovery of downed or damaged aircraft, including self-retrieval, the lift of heavy bulky equipment and supplies by external suspension from the aircraft, and the towing of craft, vehicles, and mine countermeasure devices. The military advantages offered by a shipboard compatible improved lift helicopter have been recognized in Navy/Marine Corps studies and confirmed in combat operations in Vietnam. The Navy/Marine Corps RH/CH-53A/D's are the largest operational helicopters capable of full operation and maintenance aboard LPH/LHA and superior Navy ships. Payload limitations (about 8 tons) of the H-53 series have imposed restrictions on Navy and Marine missions and demonstrated a need to develop an improved version of the H-53 with increased lift capability.

A prototype approach will be used for this development program.

This helicopter will be similar to the basic CH-53D with the following exceptions:

1. 79 foot main rotor diameter vice 72 foot main rotor diameter.
2. 7 titanium spar main rotor blades vice 6 aluminum spar blades.
3. Improved main rotor head (Improved CH-53 seals and bearings and follow-on elastomeric head when qualified).
4. 20 foot tail rotor diameter vice 16 foot, with a new vertical fin, tail rotor canted 20° from the vertical, and extended empennage.
5. 11,570 shaft horsepower main gear box vice 7,560 shaft horespower main gear box.
6. Three T64-GE-415 turbine engines vice two T64-GE-413 turbine engines.
7. Full provisions (weight, space, and plumbing) for external drop tanks, fuel jettisoning, air-to-air and ship-to-air refueling.
8. Addition of a rescue, personnel and light cargo hoist.

Tradeoffs will be made in the Improved CH-53 development to achieve optimum balance among improved lift, improved reliability, shipboard compatibility, commonality with H-53 series helicopters, and cost.

W11X8 - VCX. This project will develop a multi-engine jet Carrier Onboard Delivery (COD) aircraft in the 45,000 to 55,000 pound class with endurance of 6 hours, extended with inflight refueling; range (unrefueled) 2,200 nautical miles; cruise speed 330 Knots True Air Speed (KTAS); payload 10,000 pounds to 2,200 nautical miles, 18 passenger or 8 stretchers; adaptable to tanker, electronic warfare, and airborne early warning missions.

WORK PERFORMED BY:

W1425 - CH-53E. Prime contractor: Sikorsky Aircraft Division, United Aircraft Corporation, Stratford, Connecticut.
Principal subcontractors: Engine - General Electric, Lynn, Massachusetts.
Gearboxes - The Buehler Corporation, Indianapolis, Indiana.

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W11X8 - VCX. The Carrier Onboard Delivery (COD) aircraft program will be procured on an industry wide competition unless compelling factors dictate otherwise. Therefore, prime and major subcontractors cannot be identified at this time.

Fiscal Year 1972 Program:

W142s - CH-53E. Congressional approval of the CH-53E prototype development program occurred in December 1971. Upon release of approved funds of $2.0 million, the Navy will initiate a contract with Sikorsky Aircraft for continuation of the CH-53 design effort through Fiscal Year 1972.

W11X8 - VCX. Continue efforts to definitize a Specific Operational Requirement (SOR) for the new Carrier Onboard Delivery (COD) aircraft. Upon receipt of the SOR from the Chief of Naval Operations a Technical Development Plan (TDP) will be prepared and a request for proposal will be issued for an industry wide design competition for the new COD aircraft.

Fiscal Year 1973 Planned Program:

W142s - CH-53E. The design effort for prototype development will be completed, tradeoff studies relating to a balanced configuration with respect to component commonality, performance, maintainability/reliability and overall cost will be initiated, and prototype tooling will begin.

W11X8 - VCX. Conduct engineering design study and preliminary wind tunnel tests.

Program to Completion:

W142s - CH-53E. Phase 1 of the program (prototype development) will terminate in Fiscal Year 1974 with the fabrication, testing, and demonstration of two developmental prototypes and the procurement of long lead components in support of Phase 2 of the development program. Phase 2, to be wholly funded in Fiscal Year 1975, will involve the fabrication of two production configured prototypes, a static test article and all test and evaluation through the Board of Inspection and Survey (BIS).

W11X8 - VCX. Fabricate, test and demonstrate a minimum of two developmental prototypes. Upon completion of testing, and with Defense Systems Acquisition Review Council (DSARC) III approval, enter into full production.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	11,670	0	14,000	Continuing	NA

Chairman ELLENDER. Of the $14 million requested for aircraft engineering systems, $4 million is for the project entitled "VCX aircraft." This seems to be a new initiative. Please describe the objectives of this program.

Dr. FROSCH. The objective of the VCX program is to develop a suitable replacement for the C2A, carrier onboard delivery (COD) aircraft to fulfill the continuing need for rapid response delivery of high priority cargo/personnel to and from carrier task forces at sea. The capabilities of the current COD aircraft, as well as total numbers are only marginally satisfactory in fulfilling peacetime requirements and will commence reaching the overage category in 1975.

Senator YOUNG. Tell us what you hope to accomplish with the funds you are requesting for fiscal year 1973.

Dr. FROSCH. The $4 million requested in the fiscal year 1973 budget is intended to cover preliminary design, analysis, and limited tests in the categories outlined on this list which I will provide for the record.

(The information follows:)

	Millions
Airframe engineering design analysis	$1.00
Cargo system mockup and demonstration	0.40
Manufacturing and test plans	0.18
Wind tunnel tests	0.80
Preliminary design and layout drawings	1.50
Detail specifications	0.12
Total	4.00

Chairman ELLENDER. I note in the descriptive summary that you are planning to procure four of these aircraft in fiscal year 1976. Since this program is just beginning, is it realistic to assume that you will be ready to procure four of these aircraft in fiscal year 1976?

Dr. FROSCH. We believe it is realistic at this time. With an optimum development program, initial procurement could be accomplished in fiscal year 1976. However, fiscal constraints may delay development and require deferral of initial procurement beyond that time frame.

Chairman ELLENDER. According to the descriptive summary, a minimum of 30 of the COD aircraft is required to support five carriers operating at an average radius of 1,200 miles from resupply bases. By the schedule set out in the descriptive summary, you will have procured only 16 of these aircraft through 1977, and I note that the aircraft now in use will be reaching the overage category in 1975. How many carriers do you anticipate will need the support of these COD aircraft in fiscal year 1977, and if there are as many as five, how do you plan to make up the difference between the number you have and the 30-odd needed?

Dr. FROSCH. There is some variation among the various studies which have been used in computing the number of COD aircraft required. This variation is attributable to the differences in scenarios and assumptions upon which the computation is based. The factors which have the greatest impact on the number of COD aircraft required include the estimate of daily cargo/passenger requirements per carrier, number of operating carriers, average range from support base to carrier, average aircraft speed, and utilization rates.

Based on cargo/passenger requirements projected into the 1977–1990 time frame and the capabilities proposed for the VCX, a force of

30 operating COD aircraft at a peacetime utilization rate of 90 hours per month would fulfill the total air deliverable priority requirements of five carriers operating at 1,200 miles from support bases or a correspondingly greater number of carriers at lesser average ranges. This same force of COD aircraft could provide minimum essential cargo to a greater number of carriers at increased ranges for limited periods of time by resorting to a surge utilization rate of 150 hours per month and by limiting categories of air deliverable material. It will be necessary to extend the procurement of COD aircraft beyond fiscal year 1977 in order to complete the total buy of 36 aircraft, 30 operating aircraft and six pipeline.

Senator YOUNG. I note in the descriptive summary that, in fiscal year 1976, you plan to procure four VCX aircraft at a cost of $139,800,000 or a unit cost of approximately $35 million, and in fiscal year 1977, you plan to procure 12 at a cost of $98.2 million, for a unit cost of approximately $8.2 million. Even taking into consideration the difference in cost that always exists between the early production models of a new system and later models of the same systems, isn't the difference between $35 million per aircraft and $8.2 million per aircraft excessive?

Dr. FROSCH. The procurement cost estimates in the descriptive summary are preliminary estimates which have been developed with minimum program definition upon which they could be based. These figures will be refined as the program develops and the candidate aircraft is selected.

Senator YOUNG. Of the total requested for aircraft systems, $10 million is for the project entitled "CH–53E helicopter system." I note that $3.7 million was provided for this engineering development effort in fiscal year 1971 and no funds were provided in fiscal year 1972. Could you comment on this, please?

Dr. FROSCH. I'd be glad to, Senator Young. The $3.7 million to which you refer is fiscal year 1971 and prior. Two million of that was fiscal year 1971 funds and will be expended in fiscal year 1972 as a continuation of the design effort. Since actual fabrication of the prototypes will commence with fiscal year 1973 funds, if approved, it was not necessary to request additional fiscal year 1972 funds.

Chairman ELLENDER. According to the descriptive summary, the Navy provided some $9 million to the Army for initial funding support of a heavy lift helicopter program. When was this money provided, and was it provided from the Navy R. & D. program?

Dr. FROSCH. The $9 million was provided to the Army from the Navy R. & D. program in May 1971 as directed by the Deputy Secretary of Defense in his cover sheet No. 1 to the heavy lift helicopter development concept paper.

Senator YOUNG. Why was it decided to separate the Navy development of a lift helicopter from that of the Army's heavy lift helicopter development program?

Dr. FROSCH. Again, referring to the cover sheet to the heavy lift helicopter development concept paper, the Deputy Secretary of Defense stated, "It was found that none of the designs submitted were fully acceptable for routine shipboard basing on ships of primary interest to the Navy. For this reason, a program was authorized to develop a smaller shipboard based helicopter that would result fom upgrading of an existing Marine Corps inventory aircraft (CH–53)."

Chairman ELLENDER. Describe what modifications to the CH–53D helicopter will be necessary to bring about the desired results, and tell us what additional capabilities you expect to realize from this modification program.

Dr. FROSCH. First, Mr. Chairman, let me quote that this is not an engineering change or modification to existing inventory CH–53D's. Rather, it is an upgrading of the design which will permit us to fabricate new aircraft. The fuselage, cockpit, and cabin structure will remain the same as the CH–53D. An additional T–64 engine will be added to the two T–64's in the current design, and an additional main rotor blade will be added for a total of seven. The nail pylon will be lengthened some 40 inches, and the tail rotor increased in diameter 4 feet as well as being canted 20 degrees. A new main gearbox will be provided to accommodate the additional shaft horsepower obtained by the addition of the third engine. With these design changes, the CH–53 performance will be greatly improved. Lift will be increased from 8 tons to 16 tons, maximum air speed will be improved, and range and endurance will be tripled.

Senator YOUNG. What are you hoping to accomplish in your program for fiscal year 1972?

Dr. FROSCH. We will continue with the design effort and continue testing the dynamic systems on the propulsion system test bed.

Chairman ELLENDER. Just what will you be doing in your program for fiscal year 1973?

Dr. FROSCH. We will continue the prototype design effort, tradeoff studies, and commence fabrication of the two prototypes.

Chairman ELLENDER. When do you expect to build the two prototypes you refer to in connection with the phase I development of this helicopter?

Dr. FROSCH. We expect to commence fabrication in fiscal year 1973, and have currently scheduled the first flight on the first prototype in March 1974. The second prototype will trail by about 1 month.

VERSATILE AVIONICS SHOP TEST SYSTEM

Chairman ELLENDER. Of the total requested for Aircraft and Related Equipment, $2 million is requested for the program entitled "Avionics (Engineering)—Avionics Development (Versatile Avionics Shop Test System)". Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

AVIONICS (ENGINEERING)

CATEGORY: ADVANCED DEVELOPMENT

Description.—The VAST (Versatile Avionics Shop Test) System, a computer-controlled integrated system of testing modules and response monitors, will provide aircraft carriers and selected shore installations with an avionic, intermediate/depot level testing capability independent of weapon systems orientations. VAST has the capability of providing the broad range of stimulus and the measurement capability required to test a major portion of the avionics subsystems in the F–14A, E–2C and S–3A Weapon Systems. The principal features of VAST are functional versatility and adaptability to changing test requirements. It should produce a reduction in CV (aircraft carrier) avionics shop space requirements in shop personnel, a substantial reduction in maintenance training costs, a depth of testing capability to the piece-part level and a life span of at

least twenty years utilizing programming and stimulus/building block updating facilities.

Work performed by.—Prime Contractor, PRD Electronics, Inc., Syosset, Long Island, New York—Research and Development; Naval Air Development Center, Warminster, Pennsylvania—Project Technical Direction; ARINC, Annapolis, Maryland—performed reliability audit; Technical Media Systems, Hollywood, California—computer programs; RCA, Burlington, Massachusetts—developed design techniques; Naval Air Test Center, Patuxent River, Maryland—Test and Evaluation. NAEC Philadelphia—Test Program Set Supervision.

Fiscal year 1972 program.—A Test and Evaluation of the AN/USM–335(V) VAST System was completed in August 1971. Operational Suitability Demonstrations will be conducted at two designated A–6A support sites commencing April 1972. Funding is limited to costs recoverable from and budgeted for SCNS support. Lockheed Aircraft Corporation was furnished AN/USM–247(V) VAST Systems for the program debug and verification of S–3A Avionics Systems. A System was installed in USS KITTY HAWK (CVA–63) for an Operational Test and Evaluation in an aircraft carrier environment. Work is currently proceeding to redesign, consolidate and simplify the VAST interfaces to reduce set up times. The development of a Programmable Multifunction Measurement Unit and a Universal Signal Generator was started. Studies were conducted for new applications in order to increase the utility of VAST; to develop more cost effective programming production techniques, failure prediction techniques, diagnostic techniques and automatic English Language Program Generation.

Fiscal year 1973 planned program.—The development effort will continue in the area of design fabrication and verification of new building blocks as required to maintain VAST within the state of the art. Advanced packaging and programming techniques will be investigated to increase the versatility. There is a decrease in funds for FY 1973 because the majority of VAST Building Blocks have been developed and the AN/USM–247(V), Test and Evaluation will be completed in [deleted].

Program to completion.—RDT&E funds for the VAST development will terminate at the end of FY 1973. RDT&E funds required beyond FY 73, for VAST, will be provided for by individual development projects and programs requiring the VAST development.

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, $2,000; fiscal year 1972, $3,063; fiscal year 1973, $2,030; additional funds to completion is $0; and the total estimated cost is not available.

Senator YOUNG. What do you plan to do with the $2 million you are requesting for fiscal year 1973 for the continued engineering development of the VAST system?

Dr. FROSCH. Development efforts will continue in the area of design fabrication and verification of new building blocks required to maintain the Versatile Avionics Shop Test System (VAST) within the state-of-the-art. Advanced packaging and programing techniques will be investigated to increase the versatility of VAST.

Chairman ELLENDER. This system has been procured for several years past, and I note in the descriptive summary that the continued research and development program is expected to be completed in fiscal year 1973. What additional capabilities for the VAST have been developed since the initial operational use of this system?

Dr. FROSCH. In addition to the normal evolutionary changes brought on by improvement in the state-of-the-art, the major change involves the standardization to a single configuration, whereby all supported aircraft utilize identical VAST equipment.

AIR ANTI-SUBMARINE WARFARE

Chairman ELLENDER. For fiscal year 1973, $12.9 million is requested for the continuing engineering development program entitled "Air Antisubmarine Warfare (Engineering)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

AIR ASW (ENGINEERING)

CATEGORY: ENGINEERING DEVELOPMENT

Description.—This element was initiated in FY 1971 to provide for the orderly transition of advanced development projects involving airborne ASW equipment and sensors into the engineering development phase. These projects embrace acoustic and non-acoustic sensors for the detection, classification and localization of submarines as well as aircraft electronics systems for ASW. The FY 1973 program consists of five budgeted projects—W21–17, Airborne ASW RADAR (APS–116); W21–20, Command Active Sonobuoy Systems (CASS/DICASS); W21–38, Machine Assisted Detection and Classification (MADC); W21–42, Helicopter Sensors and W21–43, [deleted] Sonobuoy. Helo Sensors project is budgeted over $3 million in FY 1973 and is discussed in detail in separate descriptive summary.

1. Project: *W21–17, Airborne ASW Radar (APS–116).* This project will provide a high sea state, small surface piercing target detection radar for the S3A.

2. Project: *W21–20, Command Active Sonobuoy System.* The Command active sonobuoy systems (CASS) and Directional CASS (DICASS) will provide an increased capability active acoustic localization sensor for all air ASW platforms.

3. Project: *W21–38, Machine Assisted Detection and Classification.* This project will provide an operator assist for the recognition of [deleted] signals detected and processed by the current equipment.

4. Project: *W21–42, Helicopter Sensors Development.* This project consists of five individual efforts for improved helicopter sensors, equipment and armament—(1) light weight, dual purpose (air and surface target detection), RADAR, (2) Advanced helicopter sonar, (3) electronic threat detector, (4) night classification device and (5) Air to surface missile investigation.

5. Project: *W21–43* [deleted] *Sonobuoy.* This project consists of an environmental measurement program and a new sonobuoy development effort. [Deleted.] [Deleted.]

Work performed by.—Project W21–17 RADAR: Texas Instruments Company, Dallas, Texas. Project W21–20 Airborne Active Sonobuoy Systems: Magnavox Corp., Fort Wayne, Ind.; Raytheon Corp., Portsmouth, R.I.; Sparton Electronics, Jackson, Mich. All: Naval Air Development Center, Warminster, Pa.

Fiscal year 1972 program.—Project 21–17 RADAR: Complete Technical/Operational Evaluation of basic radar. Test advanced development model of Radar Automatic Target Detector (RATD). Project 21–20. Airborne Active Sonobuoy Systems: Complete CASS OPEVAL and commence procurement of system. Procure DICASS processor and sonobuoy models for evaluation. Project 21–38. Machine Assisted Detection and Classification (MADC). Continue data collection and analysis efforts. Project 21–42 Helo Sensors: Complete Radar candidate feasibility demonstrations. Issue Request for Proposal (RFP) and award contract for dual-purpose Radar. Commence development of advanced helicopter sonar. Continue air-to-surface missile firings from helicopter. Project 21–43. [Deleted] Sonobuoy. Commence environmental data collection. Conduct sea tests of sonobuoy developmental models.

Fiscal year 1973 Planned Program.—Project W21–17 Radar: Commence evaluation of RATD. Procure APS–116 for S3A aircraft installation. Project W21–20, Airborne Active Sonobuoy Systems. Procure CASS Processors and sonobuoys for fleet use. Complete design approval testing of DICASS sonobuoys. Commence Technical Evaluation of DICASS system. Project W21–38, Machine Assisted Detection and Classification. Continue development of [deleted]. Continue programs for P–3B and P–3C aircraft updates. Project W21–42, Helo Sensors. Continue development of dual-purpose Radar. Continue development of helo sonar. Test and select most suitable night classification device for development. Project W21–43, [deleted] Sonobuoy. Complete environmental data collection program. Select and award contract for development of sonobuoy.

Program to completion.—Project 21–20. Airborne Active Sonobuoy Systems. Complete Directional Command Active Sonobuoy System evaluations [deleted]. Initiate procurement [deleted] for a [deleted] Initial Operational Capability (IOC). Project 21–38. Machine Assisted Detection and Classification (MADC). Complete prototype program and evaluate [deleted]. Commence P3C update with software program integration [deleted]. Continue [deleted] data collection efforts [deleted]. Project W21–42. Helicopter Sensors. Complete Radar development and conduct evaluations [deleted]. Complete development for night classifi-

cation device and conduct evaluations [deleted]. Complete development of sonar and conduct evaluations [deleted]. Project W21–43, [deleted] Sonobuoy. Complete fabrication of air droppable development models and commence evaluations [deleted]. Commence production [deleted] for a FY [deleted].

Resources (In thousands of dollars:)

R.D.T. & E., N funds for fiscal year 1971, 276,342;[1] fiscal year 1972, 9,220; fiscal year 1973, 12,925; additional funds to completion are continuing and the total estimated cost is not available.

Chairman ELLENDER. Please provide a tabulation for the record listing each of the projects funded under this element for fiscal year 1973, the amounts for fiscal years 1971 and 1972 and the request for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

AIR ANTI-SUBMARINE WARFARE (ENGR) FISCAL YEAR FUNDING

[Millions of dollars]

Project	1971	1972	1973 request
Airborne ASW radar	5.930	1.538	1.880
Airborne active Sonobuoy system	3.402	4.091	2.035
Machine assisted detection and classification	[1].700	[1] 1.175	1.610
Helicopter sensors	[2].870	[2] 6.050	4.640
[Deleted] Sonobuoy	[1] 3.445	2.953	2.760

[1] Funded in advanced development under the Advanced Acoustic Search Sensors project.
[2] Funded in advanced development.

Senator YOUNG. Are any projects being funded under this program which were not funded in previous years?

Dr. FROSCH. All these projects were funded in previous years. This is the first year that machine assisted detection and classification has been listed in Engineering Development as a separate project. Previously, it was in advanced development under the Advanced Acoustic Search Sensors project. The Helicopter Sensors project was transferred from advanced development this year.

Chairman ELLENDER. Please give us a brief, unclassified description of these projects and tell us what you hope to accomplish in them in fiscal year 1973.

Dr. FROSCH. The machine assisted detection and classification development is intended to give our acoustic sensor operators a computer assist to improve their efficiency in a very difficult task. This project has two parts. First, the development of the computer software which will perform the logic sequence necessary on each detected signal. Second, data collection and analysis to establish and verify automatic classification techniques. In fiscal year 1973, we enter engineering development and will accomplish the computer updates for the P–3 aircraft. [Deleted.] The Helicopter Sensors project was established in fiscal year 1971 to improve the capabilities of our current fleet helicopters in antisubmarine warfare and in antiship missile defense. The project consists of five efforts: (1) To develop a lightweight dual purpose (air and surface target detection) radar, (2) to develop an improved capability dipping sonar, (3) to develop a night classification capability, (4) to develop an improved electronic warfare capability, and (5) to determine the feasibility of employing existing light-

[1] Includes projects W2106 and W3672 which are not included in this element for FY 1972 and FY 1973.

weight missiles from helicopters in an air-to-surface mode. In fiscal year 1973 we plan to: (1) Commence fabrication of an advanced development model radar, (2) continue development of the sonar, (3) complete fabrication, test and select the best candidate night classification device, (4) complete fabrication and evaluate an improved electronic support measures system, and (5) complete the missile feasibility work.

Chairman ELLENDER. I note that, in fiscal year 1971, $276 million was provided for this program; $9 million was provided in fiscal year 1972; and $12.9 million is requested for fiscal year 1973. Please comment on the large decrease in funds requested since fiscal year 1971.

Dr. FROSCH. The $276 million figure for fiscal year 1971 included the funds for projects W21–06, the S–3A, and W36–72, acoustic information. After 1971, the S–3A was assigned its own program element, and acoustic information has not been funded in fiscal years 1972 and 1973. The S–3A was funded at over $265 million in fiscal year 1971, which accounts for the bulk of the difference.

Senator YOUNG. Of the total requested for Air ASW, $4.6 million is for the project entitled "Helicopter Sensors." Will you describe briefly what has been accomplished in this project in fiscal years 1971 and 1972?

Dr. FROSCH. Fiscal year 1971 was the first year of the project. The development plan was completed, specifications were developed, and a feasibility demonstration of selected radar candidates was conducted. Funding for that year was $870,000. In fiscal year 1972, we completed testing of the demonstration radars, initiated procurement for development models of candidate forward looking infrared and active low light level television systems, commenced design of the improved dipping sonar, conducted air-to-surface firing tests of the Sidewinder and Sparrow missiles, commenced a sea environment laser missile guidance test program, and finally commenced fabrication of an improved electronic support measures system for our helicopters. All of these efforts were aimed at achieving short-term improvements in our helicopters' capabilities.

Chairman ELLENDER. What will you do with the $4.6 million you are requesting for fiscal year 1973?

Dr. FROSCH. In fiscal year 1973, we will be fabricating an advanced development model of a new lightweight radar for our helicopters, evaluate the improved electronic support measures system, and test and select the best of the night classification candidates for full-scale development. The missile test project will be completed, and the sonar will be nearing completion for an evaluation scheduled for the next year.

Senator YOUNG. Why do you need the increase of $3.7 million for Air ASW that you are requesting for fiscal year 1973?

Dr. FROSCH. The increase in the program element request is the result of adding the two new projects, machine assisted detection and classification and helicopter sensors, this year. The request for each of the other projects that remained in the element are actually less than last year's budget. These additional funds are required to carry on with these projects at a reasonable rate. I have described the fiscal year 1973 effort in my earlier answer.

Air Electronic Warfare (Engineering)

Chairman Ellender. For fiscal year 1973, $8.9 million is requested for a number of projects funded under the program element entitled "Air Electronic Warfare (Engineering)." Has the committee been furnished with complete information on this program?

Dr. Frosch. Yes, sir; complete details have been provided.

Other Air Developments

Chairman Ellender. Of the total requested for aircraft and related equipment, $1.2 million is for the program entitled "Other Air Developments." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Other Air Development (Engineering)

Category: Engineering Development

Budget Activity: 2-Aircraft and Related Equipment

DESCRIPTION:

W4551 - Aircraft Handling and Servicing Equipment. This project is concerned with the ground support of aircraft both ashore and afloat. It involves the full range of concepts, equipments and systems required for effective ground testing, servicing, handling and maintenance of aircraft and aircraft systems. This project also involves the development of equipment for arming aircraft and handling air-launched weapons. The objectives of this project encompass development of advance systems for servicing and handling aircraft and aircraft subsystems. This also includes the development of essential ground fire suppression systems for carriers as well as equipment required to provide effective weapon handling, distribution and stowage throughout the logistic cycle and aircraft arming.

W4554 - Search and Rescue Systems. This project provides for the design, development, test and evaluation efforts required to achieve a suit of equipments for detection, localization, identification and recovery of aircrewmen downed in hostile environments. These equipments are divided into categories as follows: (1) Improved Detection/Localization/Communication, (2) Air-to-Ground (Fixed-Wing) Retrieval, (3) Air-to-Air (Fixed-Wing) Retrieval, (4) Ground-to-Air (Propulsion) Retrieval and, (5) Air-to-Air Self-Rescue. These equipments are being developed in a sequential manner to provide the Fleet with an increasing capacity to rescue aircrewmen downed in hostile environments. Improved signal devices and a faster, higher capacity helicopter-mounted retrieval which will provide an immediate improvement in the Fleet's Search and Rescue (SAR) capacity. Near term solutions being considered will permit retrieval by fixed-wing aircraft or by a self-propelled air dropped package, or by mid-air engagement following ejection. The long term, future Search and Rescue (SAR) capability will be provided by a system called AERCAB (Aircrew Escape/Rescue Capability) which is a flying ejection seat to permit the aircrewman to fly himself from the hostile territory to an area more hospitable for rescue.

WORK PERFORMED BY:

W4551 - Aircraft Handling and Service Equipment. The Naval Air Engineering Center and the Naval Air Development Center.

Contracts for certain specific tasks have been awarded to:

1. Western Gear Corporation, Everett, Washington
2. Western Gear Corporation, Lynwood, California
3. Teledyne-Sprague Engineering, Gardena, California
4. Technology Incorporated, Dayton, Ohio

W4554 - Search and Rescue System.

In-House:
-Naval Air Development Center
Warminster, Pennsylvania
-Naval Air Test Center
Patuxent River, Maryland
-Naval Aerospace Recovery Facility
El Centro, California
-Naval Weapons Center
China Lake, California
-Naval Ordnance Station
Indian Head, Maryland

Contractors:
-Kaman Aerospace Corporation
Bloomfield, Connecticut
-Stratos-Western/Fairchild Hiller Corporation
Manhattan Beach, California
-Aerospace General Corporation
Odessa, Texas
-Lockheed Aircraft Services Corporation
Ontario, California

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM:

FY 1972 Program:

W4551 - Aircraft Handling and Service Equipment. Prototype of "Fail Safe Tire Inflation System" will be completed and Technical Evaluation implemented, prototype of the advanced "Self-Propelled Twin Agent Fire Fighting Unit," prototype model of the "Automated Fuel Control Test Stand" will be completed and installed, development of a multi-purpose aircraft handling vehicle, development of a 5000 pound capacity shipboard weapons loader to support the Improved Rearmament Rate Program (IRRP) will be initiated. Development of a Universal Bomb and Missile Assembly Station for Naval Weapon Stations and Air Stations will be initiated also to support IRRP and the "All-up Round" concept. Engineering Development of a "Regenerative Air Cycle Ground Cooling Unit" will be implemented.

W4554 - Search and Rescue System. Primary emphasis is being placed on a more definitive study of the anticipated combat Search and Rescue (SAR) environments and on continued development of near term systems. In preparation for the start of major developments in FY 1973, minimal test and evaluation of the other concepts is being continued.

a. Completion of the evaluation of the Single Integrated Signal Device with nighttime capability. Preparation of data package for production procurement.

b. Completion and final reporting of the contractor test program of the MINICOPTER air-to-ground rescue vehicle.

c. Continued test and evaluation of the selected Air-to-Air Self-Rescue System (AERCAB) concept to obtain additional preliminary design data.

FY 1973 Planned Program:

W4551 - Aircraft Handling and Service Equipment. A fully integrated (complete system) fully automatic fuel control test stand will be developed, a prototype "Universal Handling Vehicle" for carriers will be fabricated and evaluated. Technical Evaluation and complete design development of the Variable Geometry Air Dynamometer will be completed. Prototype Universal Bomb and Missile Assembly Stations will be fabricated and evaluated. Engineering Development of the 5000 pound capacity Shipboard Weapons Loader will continue. Development of Quality Assurance System for Fuel Service Monitor Fuzes will be completed and evaluated. Engineering Development of the "Regenerative Air Cycle Ground Cooling Units" will be completed and Technical Evaluation will be implemented. Engineering Development of the "Radioactive Temperature Indicator" system for determining maximum temperatures reached in aircraft engine turbine "hot sections"

will be implemented. The development of a "Multi-Purpose Sonic Energy Cleaning System" for aircraft components will be graduated from Exploratory Development. The development of a semi-automated "Corrosion Inhibitive Aircraft Washing System" will be graduated from Exploratory Development. Engineering Development of a "Running Torque Testor" for advanced aircraft instrument testing will be initiated. The increase in funding over FY 1972 was required in order to complete current high priority projects and to initiate "development for service use" of a number of essential ground support systems. The majority of the "new initiatives" implemented are the results of Exploratory Development projects.

RESOURCES: ($ in thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	3,239	1,662	1,236	Continuing	N.A.

Chairman ELLENDER. I note that the entire sum requested for fiscal year 1973 is for the project entitled "Aircraft Handling and Servicing Equipment." According to the descriptive summary, the increase in the funds requested for fiscal year 1973—$49,000 over the funds requested for fiscal year 1972—is for completing certain high-priority items and for some new initiatives. Could you describe these new initiatives and tell us what you hope to accomplish in them in fiscal year 1973.

Dr. FROSCH. High-priority items and new initiative for fiscal year 1973 include:

1. Design of a "Multipurpose Sonic Energy Cleaning System" for aircraft components.

This task is progressing from exploratory development (fiscal year 1971–72). It will represent the first Government design development of this type (previously, "ultrasonic cleansers" were procured using "performance specifications" for each specific application without any development effort). Exploratory development efforts were used to develop the required technology and to demonstrate the technical feasibility. This task is ready for development for service use.

Engineering development will be initiated in fiscal year 1973. The prototype design will be completed, and the required process-techniques required to implement a multipurpose concept will be developed. Upon ultimate completion, this system will provide for standardization and eliminate proliferation of specialized cleaning units of this type.

2. Design of a "Radioactive (Radio Krypton) Temperature Indicator System" for continual monitoring of aircraft gas turbine engine "hot section" temperatures.

There is no such system now available, and suspected over temperatures now lead to costly replacements which may not be warranted.

This task is also progressing from exploratory development. An "engineering breadboard" system was developed and tested. Technical feasibility has been demonstrated, and the required design criteria has been defined. This task is ready for engineering development.

In fiscal year 1973, a full-scale prototype system (isotype impregnation unit and analysis unit) will be designed. The complete design baseline will be defined, and hardware requirements will be established.

3. Development of a "running torque tester" for diagnoses of aircraft precision instruments. The objective of this task is to develop a diagnostic unit to accurately determine the ball-bearing friction torque developed in aircraft instrument movements. This type of diagnosis is required to determine the mechanical efficiency as well as accuracy of the instruments.

The technology has been developed. In 1973 the design of practical hardware will be initiated, based upon the available technology.

4. Design of a "semiautomated corrosion control system" for aircraft.

This task is progressing from exploratory development. Efficient corrosion inhibitors were developed and significant corrosion reduction demonstrated. However, the only reliable inhibitors were shown to be deleterious to aquatic life. Pollution control techniques were evaluated, and an optimal system has been defined.

The first phase of the engineering development task will be the design of a "recirculatory aircraft wash-rinse system." This prototype

system will provide the baseline for the development of the complete corrosion control system. The results of this first phase will also be used to develop a recirculatory aircraft washdown system for the Marine Corps expeditionary requirements (it has been shown that effective water rinsing of naval aircraft has reduced corrosion deterioration significantly).

5. Design of a "prime mover for armament handling equipment."

The specific requirement for this vehicle was defined as a result of a cost effectiveness-operational effectiveness study of air-launched and ordnance handling and loading techniques at shore installations (fiscal year 1970–71). There is no standard vehicle designed for these operations; and in many cases, aircraft tow tractors must be inefficiently used, while in others, some type of "makeshift" vehicle is utilized. Several operational, as well as safety, problems exist in this area.

This task is aimed at developing a low-cost standard prime mover for the full range of bomb-weapons trailers and other similar equipments which meets the current and future hazard control and operational criteria (a secondary use of this equipment will be for moving other towable ground support equipment).

The design will be developed and evaluated in fiscal year 1973.

Chairman ELLENDER. In fiscal year 1971, $1.3 million was provided for a project entitled "Search and Rescue System" and in fiscal year 1972 $472,000 was provided. No funds are requested for fiscal year 1973, yet it would seem that this project has not yet been completed. Do you expect to request funds for this project in the future?

Dr. FROSCH. You are correct, Mr. Chairman, this project is not yet completed and will continue in fiscal year 1974. However, during our construction of the fiscal year 1973 budget it just was not possible to include all the continuing projects that we wished to include. A decision was made to defer continuation of this project until the following year.

TARGET DEVELOPMENT (ENGINEERING)

Chairman ELLENDER. For fiscal year 1973, $9.4 million is requested for the continuing engineering development program entitled "Target Development (engineering)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

TARGET DEVELOPMENT (ENGINEERING)

CATEGORY: ENGINEERING DEVELOPMENT

Background.—Studies and analyses are conducted on a continuing basis to define requirements for Aerial Target Systems and the technical approaches for satisfying these requirements including aerial targets and associated equipment required for realistic development test, operational evaluation and Fleet training associated with advanced weapon systems.

Description.—There are two projects in this element. The combined efforts are committed to providing Research, Development, Test and Evaluation (RDT&E) and training targets for air and surface weapons systems test and training.

W4727—Multiple Drone Control. The Naval Weapons Center is developing a system for the precise automatic control of multiple target drones in a predetermined formation for missile flight test evaluation. This Automatic Formation Drone Control (AFDC) system performs the command and control functions with the aid of a ground based computer and digital telemetry and command communication links. The AFDC system is divided into three major equipment

areas. These are the airborne equipment, ground control station, and test range interface equipment.

W4733—Aerial Target Systems Development. Included in this project area: The Q/DF–4B supersonic, full-sized drone target; ZBQM–90A target drone capable of performing at Mach [deleted] Training Low Altitude Supersonic Target (LAST) expendable missile type target to perform at Mach [deleted] for use in weapons training exercises; augmentation devices to provide realistic threat targets; a new target command system for the three Services and Miss Distance Indicator (MDI)/scoring system.

Work performed by.—Naval Air Development Center, Warminster, Pennsylvania; Naval Missile Center, Point Mugu, California; Naval Air Propulsion Test Center, Trenton, New Jersey; Naval Weapons Laboratories, Dahlgren, Virginia; Naval Weapons Center, China Lake, California; Motorola Incorporated, Phoenix, Arizona; Teledyne Ryan, San Diego, California; and Control Data Corporation, Minneapolis, Minnesota.

Fiscal year 1972 program.—W4727—Multiple Drone Control. The program for Fiscal Year 1972 includes completion of flight testing by October 1971 and release for production for the airborne units.

W4733—Aerial Target Systems Development. Conversion of the first Q/DF–4B will be completed. Prototype flight test and evaluation scheduled for completion fourth quarter. First production conversions will be initiated. ITCS development models of basic surface based control stations will begin qualification testing.

Fiscal year 1973 planned program.—W4727—Multiple Drone Control. The ITCS development model ground stations at Naval Missile Center, Point Mugu will be modified and software provided to adapt this system for Automatic Formation Drone Control (AFDC). Additional AFDC airborne equipment will be procured to provide operational capabilities at Naval Missile Center.

W4733—Aerial Target Systems Development. ZBQM–90A engine development contract scheduled for award in the third quarter. ITCS surface based system testing will be completed and system initial operational capability will be established in January 1973. Development of airborne control stations will be continued.

Program to completion.—W4727—Multiple Drone Control. The program will be completed in Fiscal Year 1973.

W4733—Aerial Target System Development. Following are the major milestones to completion of the above developments:

Initiate ZBQM–90A Engine Development, March 1973.
Initiate Training Low Altitude Supersonic Target Development, January 1975.
ZBQM–90A Development Demonstration Commence, June 1976.
ZBQM–90A Test and Evaluation Complete, June 1977.
ZBQM–90A First Production Contract, December 1977.
ZBQM–90A Initial Operational Capability, July 1979.
Training Low Altitude Supersonic Target Initial Operational Capability, January 1979.

In addition, it is anticipated that the Army Low Altitude Supersonic Target (LAST) and the Air Force High Altitude Supersonic Target (HAST) developments will progress so that Navy configuration of these targets will be operational in January 1978 and December 1977, respectively.

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, $4,205; fiscal year 1972, $8,238; fiscal year 1973, $9,359; additional funds to completion are continuing; total estimated cost is not applicable.

TARGET DEVELOPMENT (ENGINEERING)

Chairman ELLENDER. There are two projects funded under this program for fiscal year 1973. The first of these is entitled "Multiple Drone Control" for which $509,000 is requested. Would you give us a brief description of what you hope to accomplish in this project in fiscal year 1973?

Dr. FROSCH. The Integrated Target Control System (ITCS) development model ground station at Naval Missile Center, Point Mugu, will be modified and software provided to adapt this system for Automatic Formation Drone Control (AFDC). Additional AFDC air-

borne equipment will be procured to provide operational capabilities at Naval Missile Center.

Senator YOUNG. Am I correct in assuming that this program is being carried on in fiscal year 1973 at roughly the same level as in fiscal year 1972?

Dr. FROSCH. Yes, sir.

Chairman ELLENDER. The major part of the funds requested for fiscal year 1973 for target development is for the project called aerial target systems development. I know that other services have programs in the development of targets, and I wish you would tell us which services they are and how your efforts in this field are coordinated with theirs.

Dr. FROSCH. The Army and Air Force have development programs for low altitude and high altitude supersonic targets (LAST and HAST) respectively. The efforts of the Navy, Army, and Air Force are coordinated through the office of the Director, Defense Research and Engineering.

Chairman ELLENDER. Please describe the major efforts you will be working on under this project in fiscal year 1973.

Dr. FROSCH. ZBQM–90A engine development contract is scheduled for award in the third quarter. Integrated target control system surface based system testing will be completed and system initial operational capability will be established in January.

Senator YOUNG. Why do you need the increase in $1.1 million you are requesting for fiscal year 1973?

Dr. FROSCH. The $1.1 million is requested for the initial start of the ZBQM–90A target drone engine development.

MISSILES AND RELATED EQUIPMENT

Chairman ELLENDER. The next budget activity to be considered is missiles and related equipment for which $962.3 million is requested for fiscal year 1973. How much was provided for this budget activity in fiscal years 1971 and 1971?

Dr. FROSCH. A total of $438.1 million was provided for this budget activity in fiscal year 1971, and the fiscal year 1972 estimate is $564.8 million.

FLEET BALLISTIC MISSILE SYSTEM

Chairman ELLENDER. The request includes $22,192,000 for the program entitled "Fleet ballistic missile system." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FLEET BALLISTIC MISSILE (POLARIS/POSEIDON) SYSTEM

CATEGORY: OPERATIONAL SYSTEM DEVELOPMENT

Background.—Basic objective of U.S. strategic offensive forces is to deter nuclear attack on U.S. Basic objective accomplished by deployment of highly credible force capable of surviving a coordinated surprise attack and effectively retaliating. Any enemy will be deterred from attack by knowledge that retaliatory strike will inflict such damage on his urban and industrial facilities as to preclude his existence as viable political entity for long period of time.

In support of national strategy, Strategic Systems Project Office developed, produced, constructed, tested and maintained POLARIS and POSEIDON weapon

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systems. POLARIS is reliable, survivable system that serves as cornerstone of nation's deterrent forces. Its successor, POSEIDON, offers greater flexibility in employment and response to projected enemy threats, and should remain highly survivable, effective deterrent into 1980's.

Description.—FBM portion of national assured destruction objective is currently provided principally by POLARIS weapon system. POLARIS and POSEIDON are two stage ballistic missiles powered by solid fuel motors and guided by self contained inertial guidance system. Launching vehicle is SSBN, a nuclear powered submarine equipped for computing accurate positional and geoballistic data, and for launching 16 missiles. Each POSEIDON missile is able to carry multiple re-entry bodies [deleted]. Modular POSEIDON payload provides flexibility needed to assure continued deterrent effectiveness of existing force of FBM submarines in face of wide range of threats allowed by terms of anticipated arms limitation agreements.

Work performed by.—Massachusetts Institute of Technology, Cambridge, Massachusetts; Lockheed Missiles and Space Company, Sunnyvale, California; Sperry Systems Management Division, Syosset, New York; Dynamics Research Corporation, Wilmington, Massachusetts; Naval Oceanographic Office, Suitland, Maryland; Sanders Associates Incorporated, Nashua, New Hampshire; International Business Machines, Owego, New York; Honeywell Corporation, Minneapolis, Minnesota; Tracor Corporation, Austin, Texas; Applied Physics Laboratory, Johns Hopkins University, Silver Spring, Maryland; Westinghouse Electric Corporation, Sunnyvale, California and Baltimore, Maryland; Western Electric Company, New York, New York; General Electric Company, Pittsfield, Massachusetts; U.S. Naval Weapons Laboratory, Dahlgren, Virginia; Charleston Naval Shipyard, Charleston, South Carolina; Kaman Nuclear Corporation, Colorado Springs, Colorado; U.S. Naval Ordnance Laboratory, White Oak, Maryland; Naval Avionics Facility, Indianapolis, Indiana; Naval Strategic Systems Navigation Facility, Brooklyn, New York; Naval Underwater Sound Laboratory, New London, Connecticut; Naval Ammunition Depot, Crane, Indiana; North American, Autonetics, Anaheim, California; and Many Other Laboratories and Contractors.

Beginning FY 1971 management cognizance of SSBN sonar programs—AN/BQR–15 [deleted], AN/BQR–19 (TOPHAT) and AN/BQR–21 DIMUS transferred from Anti-Submarine Warfare Project Office to Strategic Systems Project Office. Development of AN/BQR–19 completed. [Deleted.]

Fiscal year 1972 program.—POSEIDON development program completed. FBM system funding requirements related primarily to missile and launcher incentive fees, completion of development of MK–88 Mod–1 fire control system, navigation improvements, sonar development and system effectiveness and vulnerability studies extending beyond POSEIDON development objectives that were keyed to initial operational capability.

a. In weapon system development FY 1972 funding will complete development of MK–88 Mod–1 fire control system which will be installed on all SSBNs with the POSEIDON configuration. Funding also included for continuing development effort for improved navigation capability. Prototype Loran sensor equipments and precision frequency standard equipments for phase shift system will be installed on AG–153 and evaluated during FY 1972. Navigation sonar site bias data is under analysis and computer programming and calibration procedures are being prepared. [Deleted.]

b. In SSBN sonars two competitive AN/BQR–21 DIMUS designs have been completed and a single contractor is being selected for the fabrication of three engineering development models. [Deleted.]

c. FY 1972 funds are being used to identify and assess vulnerabilities and improve effectiveness of Fleet Ballistic Missile weapon system. Effort supports operational research, engineering investigations and laboratory and field testing in selected areas identified as significant potential improvements in system effectiveness or major reductions in weapon system vulnerability.

d. Beginning FY 1972 TRANSIT Satellite Improvement Program (TIP) being funded under FBM program element. Effort for TRANSIT Satellite Improvement Program (TIP) being directed toward design and development of experimental satellites [deleted].

Fiscal year 1973 planned program.—a. Navigation: FY 1973 budget for navigation continues funding development of improved navigation capability. Effort expected to allow for substantially increased intervals between external navigation position references and corresponding reduction in exposures of SSBN to detection without degradation in system accuracy. Improved navigation sys-

tem effort includes position reference improvement such as Loran–C phase shift development, and SINS heading alignment and reset improvements. [Deleted.]

b. System Effectiveness and Vulnerability: FY 1973 funds required to continue studies on weapon system vulnerability and effectiveness. Effort will continue to support operational research, engineering investigations and laboratory and field testing in selected areas identified as offering significant potential improvements in system effectiveness or major reductions in weapon system vulnerability.

c. SSBN Sonars: FY 1973 will continue the engineering development phase of both the DIMUS and SPAD. Evaluation of these systems will take place early in FY 1974.

d. TRANSIT Satellite Improvement Program: FY 1973 will continue effort directed toward the design and development of experimental satellites hardened against effects of radiation and incorporating disturbance compensation system and an isotopic power system.

Program to completion.—Current goal of FBM system program is deployment of C–3 (POSEIDON) missiles on remaining 24 SSBNs. These submarines will be supported by tenders and TAKS modified to accommodate and handle A–3 and/or C–3 missiles, as well as extensive training facilities at Dam Neck, New London, Charleston and Pearl Harbor. Though POSEIDON development program completed, FBM system requirements in FY 1974–1977 relate primarily to improved navigation system, continuation of improved navigation satellite program, improvement of FBM sonars and continuing system effectiveness and vulnerability studies to improve overall effectiveness of Fleet Ballistic Missile weapon system.

Resources (in thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971 and prior, $3,822,500; fiscal year 1972, $33,195; fiscal year 1973, $22,192; additional funds to completion [1] are $71,600; and the total estimated cost [1] is $3,949,487.

FLEET BALLISTIC MISSILE SYSTEM

Chairman ELLENDER. How much of the total requested for 1973 is for efforts involving improved navigation, and comment, generally, on what you plan to do with these funds.

Dr. FROSCH. $5,379,000 is requested for improved navigation. The fiscal year 1973 budget for navigation continues funding development of an improved navigation capability. Effort in this area is expected to allow for substantially increased intervals between external navigation position references and a corresponding reduction in exposures of the SSBN to detection without degradation in system accuracy. The improved navigation system effort includes position reference improvement such as loran-C phase shift development, and SINS heading alinement and reset improvements. [Deleted.]

Chairman ELLENDER. How much of this $22.2 million is for work in the area of systems effectiveness and vulnerability, and comment on your planned program for fiscal year 1973 in this field.

Dr. FROSCH. $7,194,000 is being requested for systems effectiveness and vulnerability. In this area continuing studies are conducted to identify improvements to the fleet ballistic missile weapons system which promise to decrease potential vulnerabilities or to increase the effectiveness of the missile weapons system. This effort includes operational research, engineering investigations, and laboratory and field testing. [Deleted.] Studies will continue to define enemy ballistic missile defense models and threat characteristics and their impact on Polaris and Poseidon. Other studies will evaluate potential weapon system improvements that enhance system survivability or system effectiveness.

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[1] Projected currently in FYDP only through FY 1977.

Senator YOUNG. How much of this request is for work on fleet ballistic missile sonars, and comment on the objectives of your planned program in this field for 1973.

Dr. FROSCH. The request includes $5,847,000 for work on sonars unique to fleet ballistic missile submarines. Two sonar systems are involved in this request. The AN/BQR-15 [deleted] has completed operational evaluation and the basic system has received service approval. [Deleted.]

[Deleted.] The second sonar involved is the AN/BQR-21 (Dimus) [Deleted.] A single contractor is being selected in 1972, for the fabrication of three engineering development models. The funds requested for fiscal year 1973, will continue the engineering development phase of both the Dimus and Spad. Evaluation of these systems will take place in mid-1974.

Chairman ELLENDER. How much of this request is for work in the field of navigation satellite systems improvement, and comment on the objectives of your planned program for fiscal year 1973.

Dr. FROSCH. The fiscal year 1973 request includes $3,772,000 for the transit improvement program. [Deleted.] The program includes an isotopic power source under development by the AEC as a potential replacement for the solar power cells, satellite modified electronics, and a disturbance compensation system [deleted]. The fiscal year 1973 effort will continue the design and development of experimental satellites incorporating these features.

FLEET BALLISTIC MISSILE DEFENSE

Chairman ELLENDER. The request includes [deleted] for the project entitled "Fleet Ballistic Missile Defense." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

SSBN SECURITY

CATEGORY: OPERATIONAL SYSTEMS DEVELOPMENT

Background.—Need for program dedicated to maintaining continuing survivability of SSBN force originated with understanding that U.S. must explore and develop sophisticated counter-ASW capabilities for FBM force as hedge against Soviet SSN improvements.

Description.—Objective of program is conduct research and development specifically directed toward identifying and specifying counters to potential Soviet capabilities [deleted].

Work performed by.—Applied Physics Laboratory, Johns Hopkins University, Silver Spring, Maryland; Interstate Electronics Corporation, Anaheim, California; Naval Undersea Research and Development Center, San Diego, California; Operations Research Incorporated, Silver Spring, Maryland; Naval Weapons Laboratory, Dahlgren, Virginia; Naval Research Laboratory, Washington, D.C.; Charleston Naval Shipyard, Charleston, South Carolina; Naval Ordnance Laboratory, White Oak, Maryland; Western Electric Company, Whippany, New Jersey; Naval Ship Research and Development Center, Carderock, Maryland; Naval Weapons Station, Yorktown, Virginia; Naval Air Development Center, Warminster, Pennsylvania; and Naval Oceanographic Office, Suitland, Maryland.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1971 and prior accomplishments.—Initial funding established FY 1970. Effort directed toward analysis of existing and potential threats to U.S. SSBNs, and to future submarine strategic systems. Factors which influence SSBN survivability quantified in comprehensive test program and relationships

between these factors and survival probability are being studied. Operational forces utilized under this program to collect at-sea data for survivability analysis. Instrumentation developed which will provide quantified data from test program. Results of test program and survivability analysis are utilized, along with latest intelligence information, for threat definition and engagement simulation studies to help assess current and projected threats to FBM force.

Fiscal year 1972 program.—FY 1972 effort continues analysis of existing and potential capabilities [deleted]. Studies will include investigation of detection by non-acoustic as well as acoustic methods. Program for identifying parameters requiring quantification, designing instrumentation and experiments to accomplish these ends and conducting and analyzing them is being continued. Major area in acoustic analysis is at-sea exercise using dedicated SSBN and SSN to collect sufficient data to evaluate effectiveness of multi-sonar performance combining hull mounted [deleted] sonars using advanced processing techniques.

Fiscal year 1973 planned program.—FY 1973 effort will continue to determine contribution which submarine and its environment make to vulnerability of SSBN and future sea based strategic systems. Understanding of acoustic and non-acoustic phenomena will be furthered through evaluation and testing of present systems, [deleted].

Program to completion.—To continue to identify specific tactics and equipments directed toward countering potential Soviet capabilities in [deleted].

Resources (in thousands of dollars) :

R.D.T. & E.N. funds for fiscal year 1971 and prior, $18,100; fiscal year 1972, [deleted] ; fiscal year 1973, [deleted] ; additional funds to completion,[1] [deleted] ; total estimated cost[1] is [deleted].

Chairman ELLENDER. Generally speaking, what is the objective of this effort?

Dr. FROSCH. The SSBN defense program was initiated to insure that timely action is taken to preserve the survivability of our fleet ballistic missile submarines (SSBN's) in the face of the growing Soviet ASW capability. The program develops an understanding of those related technologies to identify potential threats that could arise from future Soviet ASW developments to counter our SSBN's. The program would also identify measures to be used by the United States in negating these threats. The SSBN defense program is coordinated with Navy ASW programs to insure that advances in these technologies are shared and to minimize a duplication of effort.

FLEET BALLISTIC MISSILE COMMAND AND CONTROL AND COMMUNICATIONS

Chairman ELLENDER. The request includes [deleted] for the program entitled "Fleet Ballistic Missile Command and Control—Communications." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FBM COMMAND & CONTROL COMMUNICATIONS

CATEGORY : OPERATIONAL DEVELOPMENT

Description.—Develops reliable, survivable and secure communications systems from shore to ship (GRYPHON), between National Command Authorities/Commanders-in-Chief and the deployed Fleet Ballistic Missile (FBM) forces [deleted] in pre-, trans-, and post attack environments. In addition, the program provides for development of ship-to-shore (HYDRUS), reliable, secure communication systems for command and control of FBM and Undersea Long Range Missile System (ULMS) forces. Also an objective is to develop and acquire improved coding, compression and message handling systems for the Minimum Essential Emergency Communications Network (MEECN) and to provide system engineering support to the MEECN System Engineer.

[1] Projected currently in FYDP only through FY 1977.

Work performed by.—Air Force Lincoln Laboratory, Massachusetts; Applied Physics Laboratory, John Hopkins University, Maryland; Battle, Ohio; Boeing, Washington; Bell Telephone Laboratories, New Jersey; Cornell Aeronautical Laboratory, New York; Hazelton, Virginia; Continental Electric, Texas; General Electric, New York; Operations Research Incorporated, Maryland; Radio Corporation of America, New Jersey; Sylvania, Massachusetts; Tetra-Tech, California; Vitro, Maryland; Westinghouse, Virginia; Collins, Iowa; Computer Sciences Corporation, Virginia; Cooley Laboratories, Michigan; Len Malnak Associates, New Jersey; TRW, California; Naval Electronics Systems Command, D.C.; Electronic Supply Office, Illinois; Naval Air Systems Command, D.C.; Naval Facilities Engineering Command, D.C.; Naval Electronic Laboratory Center, California; Naval Ordnance Laboratory (White Oak), Maryland; Naval Research Laboratory, D.C.; Naval Ship Research and Development Center, Maryland; Naval Training Center Great Lakes, Illinois; Naval Underwater Sound Center, Connecticut/Rhode Island; Naval Weapons Center Corona Laboratory, California; Office of Naval Research, D. C.; Post Graduate School Monterey, California; Naval Personnel Research and Development Laboratory, D. C.; Naval Civil Engineering Laboratory, California; Naval Electronic Systems Command, D.C.; and United States Coast Guard, D.C.

Fiscal year 1971 and prior accomplishments.—Provided 12 TACAMO aircraft for airborne very low frequency (VLF) Survivable communications to deployed SSBNs. [Deleted.] Determined need for development of modulation, coding and compression techniques network analysis and coverage prediction. Extremely low frequency communication studies with regard to project SANGUINE were conducted to accomplish concept formulation, energy mitigatiton studies and systems engineering. Studies were conducted toward determining the feasibility of constructing an integrated radio room for the Integrated Submarine Communications System (ISCS). [Deleted.]

Fiscal year 1972 program.—Complete Sanguine System Concept Formulation and continue environmental compatibility assurance and atmospheric measurements. Continue development of Tacoma aircraft [deleted]. Commence advanced development of integrated radio room and continue development of ISCS. [Deleted.] Commence Minimum Essential Emergency Communications Network (MEECN) design and trade-off studies. Continue data collection for develop ment [deleted].

Fiscal year 1973 planned program.—Commence validation phase of Sanguine based on results of Sanguine System Design Study and Sanguine Survivable System Study. Provide support for conversion of first of 12 Tacoma aircraft [deleted]. Proceed with fabrication of FBM integrated radio room prototype. [Deleted.] Initiate development of ship to shore terminals for Hydrus. Initiate pinger development and adaptation of the Submarine Emergency Communication Transmitted (SECT) for Undersea Long Range Missile System (ULMS) application. Complete breadboard model specifications, fabricate and test the automatic Minimum Essential Emergency Communications Network (MEECN) terminal, and begin preparation of specifications for prototype units. Use the Network Analysis Computer Simulation Program developed under Gryphon to analyze selected MEECN configurations. Continue data collection for development [deleted].

Resources (in thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, $17,844; fiscal year 1972, $13,667; fiscal year 1973 [deleted]; additional to completion are continuing; and the total estimated cost is not available.

Chairman ELLENDER. How much of the total requested for this effort is for the continuation of work on Project Sanguine?

Dr. FROSCH. $12 million.

Chairman ELLENDER. Please provide a detailed statement for the record on the status of Project Sanguine, along with a tabulation setting out in detail the various items included in the planned program for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

Sanguine has a long history of studies and experimental results. The first significant result was achieved in 1963 when signals were transmitted from an

experimental antenna in North Carolina and received aboard a submarine at depth. In 1967 Secretary McNamara directed the formation of a Navy Project Office—the Special Communications Office—to manage the development of communications systems for Fleet Ballistic Missile Command and Control. A Sanguine System Implementation Plan was prepared and a vigorous Research and Development Program initiated. As a result of this Research it was concluded that the power required for Sanguine could be reduced almost 100 fold from that postulated in the Sanguine System Implementation Plan. The program also established a test facility in Wisconsin. This test facility has been used primarily for ascertaining the environmental impact of Sanguine and to validate system decision parameters. The results of the R. & D. activities were incorporated into the system design study of December 1970.

The results of an aggressive environmental compatibility assurance program were reported in a draft Environmental Impact Statement issued in March of 1971 and updated in a Final Environmental Impact Statement for the RDT&E portion of the program issued by the Navy in April 1972. These statements conclude that no significant environmental effects are to be expected from the full scale system.

Recently, the test facility has verified that the system design calculations are valid. [Deleted.]

The fiscal 1973 program includes the work shown in the 1973 funding profie.

Sanguine fiscal year 1973 funding profile

Planned Sanguine effort, fiscal year 1973:	
Program management, system engineering support, and communication design consultation	$1,600,000
Receiving antenna and receiver subsystem design	1,850,000
Environmental program	450,000
Survivable facility/component research and test, siting data compilation	1,175,000
Wisconsin test facility operation	325,000
ELF natural parameters; propagation atmospheric noise, conductivity	250,000
Validation efforts including test and evaluation	6,350,000
Total	12,000,000

Senator YOUNG. Are any of the funds requested in this program associated with the ULMS program, and if so, tell us how much and comment on these efforts.

Dr. FROSCH. The funds in this program mutually support the present Polaris/Poseidon and will support the ULMS submarines when they become operational. The radio room equipment and antenna systems for the ULMS submarines are being funded in the ULMS program.

SIDEWINDER AIM 9L AIR-TO-AIR MISSILE

Chairman ELLENDER. The request includes $6,750,000 for the continuation of work on the 9L version of the Sidewinder missile. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

AIR/AIR WEAPONRY (OP SYS)

OPERATIONAL DEVELOPMENT

Description.—Although SIDEWINDER was the best performing air-to-air missile in Southeast Asia, it was optimized for bomber type aircraft, and performance in the dogfight role against small fighter type aircraft was well below desired. As a result, Navy and Air Force commenced development efforts for new short range air/air missile. The Deputy Secretary of Defense directed Navy and Air Force to investigate possible upgrading of SIDEWINDER. It was mutually

agreed and approved by the Department of Defense and the services that an improved SIDEWINDER (AIM–9L) would be developed jointly, using the Navy AIM–9H as the Baseline. The AIM–9L development effort commenced in August 1971 with an IOC (Initial Operational Capability) in [deleted] for both services.

The AIM–9L in general appearance is a basic SIDEWINDER, (113" long, 5" in diameter, weighs 195 lbs.), that can be carried and launched from current Navy and Air Force aircraft. [Deleted.] The AIM–9L will be compatible with all current Navy/Air Force fighter and attack aircraft and the F–14, F–15, AV–8A and the proposed AX aircraft.

Work performed by.—Naval Weapons Center, China Lake, California (Technical Manager); Naval Air Engineering Center, Philadelphia, Pennsylvania; Naval Missile Center, Pt. Mugu, California; Naval Weapons Laboratory, Dahlgren, Virginia; Naval Air Technical Services Facility, Philadelphia, Pennsylvania; Naval Air Test Center, Patuxent River, Maryland; Naval Weapons Station, Seal Beach, California; Naval Weapons Station, Concord, California; Naval Weapons Station, Yorktown, Virginia; Naval Ordnance Station, Indian Head, Maryland; Naval Weapons Evaluation Facility, Albuquerque, New Mexico; Daytheon, Lowell, Massachusetts; and Santa Barbara Research Center, Santa Barbara, California.

Fiscal year 1972 program.—FY 1972 effort includes majority of engineering effort and delivery of [deleted] engineering models. This effort includes reconfiguration of seeker, repackaging (with five addititonal functions) of electronics sections and redesign of wings and fins. [Deleted] warhead and [deleted] fuze design will be complete and engineering units will be available for tests. Design data will be complete and contract awarded for prototype units.

Fiscal year 1973 planned program.—Engineering design effort will be completed and final [deleted] engineering models will be air fired [deleted.] Prototype program will be initiated and completed [deleted]. This program includes air firing of ten units in DT (Demonstration Tests) by the Naval Weapons Center, China Lake, and ten units in NTE (Naval Technical Evaluation), by the Naval Missile Center, Pt. Mugu. The Pilot Production Program will be commenced [deleted.] Significant milestones include final release to prototype [deleted] and final release to pilot by Defense Systems Acquisition Review Council in June 1973.

Program to completion.—The SIDEWINDER AIM–9L program commenced August 1971 and is proceeding in accordance with Development Concept Paper (DCP) No. 90 with following schedule milestones:

Milestone:	*Date*
Final release to pilot	[Deleted]
Approval for service use	
Release to production	
IOC (initial operational capability)	
FOC (full operational capability)	

Resources (In thousands of dollars:)

R.D.T.&E., N funds for fiscal year 1971 and prior, $0; fiscal year 1972, $0; fiscal year 1973, $6,750; additional funds to completion are $500; and the total estimated cost is $7,250.

SIDEWINDER AIM–9L AIR-TO-AIR MISSILE

Chairman ELLENDER. Just what is the objective of this effort?

Dr. FROSCH. The objective is to develop an improved air-to-air missile for use mainly against small fighter type targets and to fulfill inventory requirements until the Agile missile becomes available [deleted].

Senator YOUNG. How does this version of the Sidewinder differ from earlier versions of this missile?

Dr. FROSCH. The Aim–9L missile has a new seeker [deleted]. In addition it will incorporate an improved fuze and warhead and have greater range.

Senator YOUNG. I note this is a joint Navy-Air Force effort. What is the total cost of this effort, and what is the arrangement for the funding by the Navy and the Air Force?

Dr. FROSCH. The total development cost of the Aim–9L is $14.065 million. The effort is jointly funded by Navy and Air Force. The Air Force provided $6.915 million for fiscal year 1972 and the Navy will provide $7.15 million for the fiscal years 1973 and 1974.

Chairman ELLENDER. As I recall, the procurement request includes funds for the pilot production of this missile. Am I correct about this?

Dr. FROSCH. Yes, sir. [Deleted] missiles will be procured at a cost of $14.7 million.

Chairman ELLENDER. On page 211 of the descriptive summary, I note the following statement: "The Sidewinder Aim–9L program commenced August 1971 and is proceeding in accordance with the development concept paper No. 90 with the following schedule milestones: final release to pilot * * *" Does this mean that the $14.7 million requested for the pilot production of this missile will not be obligated until June 1973?

Dr. FROSCH. Yes, sir. Final release to pilot must be approved by the Defense Systems Acquisition Review Council scheduled to meet June 1973.

PHOENIX AIR-TO-AIR MISSILE SYSTEM

Chairman ELLENDER. The request includes $5,062,000 for the continuation of the Phoenix missile system. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Category: Operational development—Title: Air/air weaponry (OP/SYS); Budget activity: 3-missiles and related equipment.

Background.—The primary air threat to the Fleet is envisioned as an attack by masses of bomber aircraft launching ASM's (air-to-surface missiles) from 100 to 150 miles from the center of the carrier task force. The Phoenix missile system will provide the long range launch (50 mile) multi-target track and engage capability required to provide Fleet Air Defense. (Track 24 targets simultaneously or engage 6 targets while simultaneously tracking 18 additional targets.) No other system in the world is available to fill this role; thus, the only alternative to the Phoenix system was one which would offer no long range multi-shot capability.

Description:

(*a*) Requirement. Destroy multiple air targets with conventional warheads using a supersonic all-weather fighter-borne missile.

(*b*) Description. The Phoenix Guided Missile System installed in the F–14 aircraft consists of a pulsedoppler radar and associated computer and displays which can acquire and track multiple targets at long ranges (80 nautical miles minimum against five square meter target) and make multiple, near simultaneous attacks with six long range missiles against manned or unmanned enemy aircraft at altitudes from sea level to 80,000 feet. The Phoenix Missile System is an all-weather carrier-based airborne weapon system and will provide the F–14 aircraft with the capability to fire Sparrow III and Sidewinder as well as Phoenix missiles.

Work performed by.—Hughes Aircraft Company, Culver City California (Prime); Naval Air Development Center, Warminster, Pennsylvania (Lead Technical Laboratory); Naval Weapons Laboratory, Dahlgren, Virginia; Naval Air Engineering Center, Philadelphia, Pennsylvania; Naval Weapons Center, China Lake, California; Naval Research Laboratory, Washington, D.C.; Naval Air Test Center, Patuxent River, Maryland; Naval Missile Center, Point Mugu, California, and VEDA Incorporated, Ann Arbor, Michigan.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1972 program.—Continue ground and flight evaluation of AWG–9 AMCS (XN–3) and Phoenix AIM–54A missile interfaces. Navy Preliminary

Evaluation of AWG–9 (XN–3) system installed in the TA3B was completed in September 1971 with satisfactory performance. Roofhouse and laboratory testing of YN–3 (pilot production) system will begin in FY 1972. The AWG–9 will be installed in F–14 No. 4 and No. 9. Contractor development and evaluation of the AWCS, including firing of AIM–54A and AIM–7 missiles, will be conducted during the last half of FY 1972. Two PIP (Product Improvement Program) missiles will be launched from the TA3B in January 1972 to derive maximum engineering data to confirm the pilot production (FY 1971 procurement) configuration.

Fiscal year 1973 planned program.—FY 1973 funds will be used to fund Navy field stations in support of fleet introduction of the Phoenix missile. Funding requirements take into consideration the recent change to the program schedule (initiation of BIS trials in January 1973 vice June 1972). During the first half of FY 1973 contractor demonstration of the AWCS including firings of the AIM–7, AIM–9 and AIM–54A will be conducted. Increase in funding over FY 1972 is a result of the increased intensity of testing with the F–14A deliveries to the Pt. Mugu, California test facilities.

Program to completion:

(a) Navy Technical Evaluation: July 1972–June 1973.

(b) Weapon System BIS (Board of Inspection and Survey): Commences early 1973.

(c) OPEVAL (Operational Evaluation): October 1972–June 1973.

(d) Initial Operating Capability: Fourth quarter, calendar year 1973.

Additional funding for the AWG–9 Weapon Control System for FY 1972, FY 1973 and FY 1974 will be covered by the F–14 program. The R and D funding herein will preserve AIM–54 capabilities developed in the AWG–9/AIM–54A system interface. These funds are also for field station monitoring of the AIM–54A/AWG–9 interface during the F–14A demonstration and evaluation program.

RESOURCES

[Dollars in thousands]

	Fiscal year 1971 and prior	Fiscal year 1972	Fiscal year 1973	Additional to completion	Total estimated cost
R.D.T. & E., N.:[1]					
Missile	161, 149	1, 460	2, 025	1, 624	166, 258
AWG–9	241, 684	2, 190	3, 037	2, 437	249, 348
Total funds	402, 833	3, 650	5, 062	4, 061	415, 606

[1]Adjusted to reflect ASD(COMPT) memorandum of Aug. 18, 1970. $166,300,000 of $415,600,000 total R.D.T. & E. FYDP represents Phoenix costs only. Subsequent to fiscal year 1970, 40 percent of the funding is to support the firing of the Phoenix pilot production missiles while 60 percent is to be used at the Navy field stations to monitor interface requirements between the AIM–54A Phoenix missile and the AWG–9A.

PHOENIX AIR-TO-AIR MISSILE SYSTEM

Chairman ELLENDER. Tell us exactly what you plan to do with the $5.1 million you are requesting for fiscal year 1973.

Dr. FROSCH. During fiscal year 1973 we plan to conduct contractor demonstration of the capabilities of the Phoenix/AWG–9 missile control system as incorporated in the F–14. This will include firings of AIM–7, AIM–9, and AIM–54A missiles. In addition, the Navy will commence technical and operational evaluation of the entire system. Also Navy preliminary evaluations II and III will be completed on the F–14A which will include four Phoenix missile firings.

Senator YOUNG. On page 216 of the descriptive summary, I note that the total estimated cost of the development of the Phoenix missile in the AWG–9 weapon control system is stated at $415.6 million. What was the original estimated cost of this effort?

Dr. FROSCH. The $415.6 million figure is the total amount for the development of both the Phoenix missile and the AWG–9 missile

control system. Of this, $166.3 million is for the missile and $249.3 million is for the AWG–9.

Chairman ELLENDER. As I read the tabulation on page 216 of the descriptive summary, approximately $406.5 million has been made available for this effort through fiscal year 1972. Is this correct?

Dr. FROSCH. Yes, sir; that is the amount for both the Phoenix missile and AWG–9 missile control system.

SPARROW AIM–7F MISSILE

Chairman ELLENDER. The request includes $9,725,000 for the continuation of the development of the AIM–7F version of the Sparrow missile. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Category: Operational systems development—Title: Air/Air weaponry (OPSYS); Budget activity: 3-missiles and related equipment.

Description.—An increase in Sparrow III missile performance, effectiveness and reliability is required. The AIM–7F is newest generation of Sparrow III missile family designed to significantly improve performance and reliability.

1. Project provides for initial design concept, mechanization, and the associated demonstration, test and evaluation required to achieve objective stated above.

2. The AIM–7F is a semi-active air-to-air guided missile to be used as fleet defense weapon in air intercept role or as fighter-to-fighter weapon in air combat maneuvering situation. The missile is to be launched from F4, F14 and F15 series aircraft.

3. Total weight of missile is approximately 510 pounds. Fuselage is eight inches in diameter and twelve feet long [deleted]. The improved reliability of the guidance and control unit is result of "snap start" concept [deleted]. Motor is a boost-sustained, solid propellant, [deleted]. Missile has continuous rod warhead approximately 25% heavier than in AIM–7E/7E–2.

4. Major milestones achieved and scheduled are as follows:

(*a*) Award Development Contract, July 1966.

(*b*) Award Preproduction Contract, 28 March 1968.

(*c*) Initiate Contractor Demonstration Tests/Navy Technical Evaluation, Start March 1968—Stop November 1968—Restart December 1969.

(*d*) Initiate Operational Evaluation (estimate) Second quarter fiscal year 1972.

(*e*) Initial Operation Capability (estimate). [Deleted.]

Work performed by.—Contractor for guidance and control section is Raytheon Company. Rocket motor manufacturers are Hercules Powder Company and Aerojet-General.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 Program.—Major effort will be undertaken to achieve design simplicity and performance improvements. These improvements impact areas deficient in Contractor Demonstration Tests/Navy Technical Evaluation. Contractor Demonstration Tests/Navy Technical Evaluation will be completed and Operational Evaluation will commence.

Fiscal year 1973 planned program.—FY 73 funds will be used for pilot production, reliability flight testing, design improvement investigations, design margin evaluation and Navy field station support.

Program to completion.—Funds in FY 74 and FY 75 will be used to continue effort at Navy field stations in areas of flight testing and design improvement investigations.

Resources:

R.D.T. & E.N. Funds:	*Dollars in thousands*
Fiscal year 1971 and prior	36,200
Fiscal year 1972	21,350
Fiscal year 1973	9,725
Additional to completion	4,050
Total estimated cost	71,325

SPARROW AIM–7F MISSILE

Chairman ELLENDER. On page 217 of the descriptive summary, I note the following statement: "The Aim–7F is the newest generation of the Sparrow III missile family designed to significantly improve performance and reliability." What is it about this new version of the Sparrow missile that will give us this improved performance and reliability?

Dr. FROSCH. The Aim–7F contains all solid state guidance and control units which are powered by a [deleted]. Solid state provides order of magnitude reliability over the previous vacuum tube versions. In addition, the Aim–7F is designed for what is called snap-start, [deleted]. Upon trigger squeeze the missile immediately comes up to full operating condition and is launched. The Aim–7F has a reduced minimum launch range, increased maximum range, improved countermeasure capability and greater warhead lethality.

Chairman ELLENDER. As I recall, funds were requested for the initiation of the production of this missile in fiscal years 1971 and 1972 and later withdrawn by the Navy when it was determined to continue this missile in the R. & D. stage. Am I correct about this?

Dr. FROSCH. Yes, sir; that is correct.

Senator YOUNG. Why do you feel that we are now ready to go into the pilot production of this version of the Sparrow missile?

Dr. FROSCH. The results obtained during the past year of testing during contractor development testing and navy technical evaluation leading to the current operational evaluation indicate that the Defense Systems Acquisition Review Council will approve initial production during this budget year.

Chairman ELLENDER. As I recall, this is to be one of the primary missiles for the Air Force's F–15. Am I correct about that?

Dr. FROSCH. Yes, sir; the Aim–7F is to be the only radar controlled missile for the F–15.

GUIDED GLIDE WEAPON IMPROVEMENT PROGRAM

Chairman ELLENDER. The request includes $2.8 million for the continuation of the project entitled "Modular guided glide weapon improvement program". As I recall, this involves the improvement of the Walleye weapon. Am I correct?

Dr. FROSCH. Yes, sir, you are correct.

Senator YOUNG. Just what is the nature of these improvements?

Dr. FROSCH. The guided glide weapon improvement program involves a development effort to extend the range of the Walleye weapon by enlarging the wings and [deleted] after launch through the use of a data link system. These modifications are applicable to the Walleye II weapon which is the follow-on version of the standard Walleye. Walleye II weighs [deleted].

Chairman ELLENDER. Earlier in connection with the request associated with the A–7 aircraft, there was an item of $100,000 for a project entitled "A–7E/Walleye II integration". How is this request related to the earlier request?

Dr. FROSCH. The $100,000 requested for the A–7E/Walleye II integration is needed for the design and incorporation of equipment required for the integration of an [deleted] Walleye data link capability into the A–7E aircraft. The effort is primarily concerned with the additional [deleted.]

Chairman ELLENDER. As I recall the request for the other procurement appropriation, some $12 million is requested for the modification of Walleye I weapons to the Walleye II configuration, including [deleted] extended range Walleye II's. In your opinion, does the current status of the R. & D. effort on the extended range Walleye justify proceeding with this program?

Dr. FROSCH. Yes, sir, flight tests of the extended range Walleye with data link have demonstrated the improved capabilities which accrue with these modifications. Standoff launch ranges up to [deleted] nautical miles have been achieved with direct hits on the target [deleted] by data link. Two more demonstration flights are scheduled for May which will conclude the extended range/data link development effort. Procurement of the [deleted] extended range/data link Walleyes will provide the weapons to be used in the Navy Technical Evaluation and Operational Evaluation scheduled fiscal year 1973.

CONDOR MISSILE

Chairman ELLENDER. Your request includes $6,075,000 for the continuation of work on the Condor air-to-surface weapon. Selected paragraphs from the descriptive summary will be included in the record.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Category: Operational development; Project: W1107 Condor; Title: Air/surface weaponry (OPSYS); Budget activity: 3-missiles and related equipment.

Background.—Condor is a medium range, electro-optical guided, tactical missile designed for use by attack aircraft. This tactical standoff missile is in late stage of engineering development; introduction of this capability offers a concept that will provide high attack accuracy while promising a significant reduction in aircraft attrition. It has a programmed auto-pilot for mid-course guidance and a data link which transmits a video picture for target acquisition. Terminal guidance can be automatic [deleted]. Condor is intended for use against a broad spectrum of high value targets whose defenses are centralized and intensified to the point that stand off weaponry is required. The ready-fire-aim capability of Condor permits system attack from outside target defense concentrations. Eight successful flights [deleted] have demonstrated the attributes of the basic system. The Navy Technical Evaluation is underway.

Description.—Condor will provide very accurate [deleted]. Projects provides for design, development, test, demonstration and evaluation effort necessary to achieve a design disclosure and other elements of a data package which will support procurement, inspection, installation, operation and logistic support of the Condor air-to-surface missile weapon system for A–6 or comparable aircraft.

Work performed by:

Prime Contractor: North American Rockwell Corporation, Columbus, Ohio.

Field Activities: Naval Weapons Center, China Lake, California; Naval Avionics Facility, Indianapolis, Indiana; Naval Weapons Laboratory, Dahlgren, Virginia; Naval Weapons Station, Yorktown, Virginia; Naval Missile Center, Point Mugu, California; Naval Weapons Handling Laboratory, Earle, New Jer-

sey; Naval Ordnance Station, Indian Head, Maryland; Naval Air Development Center, Warminister, Pennsylvania; Naval Air Engineering Center, Philadelphia, Pennsylvania; Naval Training Devices Center, Orlando, Florida; Naval Weapons Engineering Support Activity, Washington, D.C.; Naval Air Test Center, Patuxent River Maryland.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—Contractor demonstration has been completed. NTE and "Quasi" Operational Evaluation initiated. Preliminary investigation of the optimum growth potential version will be conducted. Development of [deleted] role wil be initiated to be tested for tactical suitability prior to any major procurement decision.

(*a*) Navy "Quasi" Operational Evaluation will be completed.

(*b*) Use of $4.5 million in FY 72 plus [deleted] program funds planned in FY 73 should permit captive and free flight testing of [deleted].

Program to completion.—Additional R.D.T. & E. funds to completion are associated with the Condor [deleted] version of Condor wil be completed in FY 75. The $20.5 milion in procurement FY 73 will cover [deleted] Condor missiles and associated production support. Additional Condor buys are shown for subsequent years.

Resources:

R.D.T. & E. funds:	
Fiscal year 1971 and prior	148,280
Fiscal year 1972	21,495
Fiscal year 1973	6,075
Additional to completion	5,650
Total estimated cost	181,500

Chairman ELLENDER. Tell us exactly what you plan to do with the $6.1 million you are requesting for Condor for fiscal year 1973.

Dr. FROSCH. Of the $6.1 million, $1.2 million will be expended on Navy in-house support of the Condor Navy technical evaluation and "Quasi" operational evaluation. The remaining $4.9 million will be expended in the development effort for a [deleted] for Condor. Contractor costs are estimated at $3.1 million and in-house support costs at $1.8 million.

Chairman ELLENDER. The procurement request includes $20.5 million for the initiation of the pilot production of the Condor missile. In your opinion does the current status of the R. & D. program justify the initiation of the pilot production of this missile?

Dr. FROSCH. The capabilities of the Condor missile were impressively demonstrated during eight successful contractor demonstration flights which were concluded in August 1971. However, the Condor program is structured as a "fly-before-buy" effort which means that the production decision is contingent upon the successful completion of the Navy technical evaluation and operational evaluation being conducted with R. & D. missiles. Since this evaluation should be completed during the second quarter of fiscal year 1973, procurement funds are also required in fiscal year 1973.

Senator YOUNG. I note the current estimated cost of this effort is stated at $181.5 million. What was the original estimated cost of this development program?

Dr. FROSCH. The original cost estimate, in 1966, was $126 million for the Condor development. The increase in the current estimate is caused primarily by the schedule slippage of approximately 2½ years due to problems encountered in trying to develop a satisfactory liquid fuel propulsion system before switching to the current solid fuel motor. Additional schedule slippage and increased development cost are at-

tributable to the redirection of the program to a "fly-before-buy" program and the use of R. & D. missiles in the evaluation of the system.

Chairman ELLENDER. I note on page 227 of the descriptive summary that $5.7 million will be required after 1973, for the Condor R. & D. program. Just what is involved in the R. & D. program after fiscal year 1973?

Dr. FROSCH. The $5.7 million reflects the funding required for the [deleted] development to be completed in fiscal year [deleted].

SURFACE DEFENSE SYSTEMS

Chairman ELLENDER. Of the total requested for missiles and related equipment $1.7 million is for a program entitled "Defensive Systems (Operational Systems Development) Surface Missile System Project." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Category: Operational systems development—Title: Defensive systems (OP SYS); Budget activity: 3-missiles and related equipment.

Description.—To ensure that the Navy's Surface Launched Guided Missile Fleet is maintained in a combat readiness state. Provides the necessary fleet support for over 75 operational ships which employ surface missile weapons systems. The Navy is dependent upon the operational effectiveness of these ships for area defense and offensive missions through the 1970's and into the 1980's. Included is the required support of the Terrior, Tartar, and Talos Missile Weapon Systems and the standard missile program. The funds in this element provide for engineering support for operational systems, minimum performance improvements, and correction of deficiencies identified through operational use.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1972 program.—Continue the in-service engineering for the Terrier, Tartar, and Talos Weapon Systems, the standard missile program, and the Tartar-D weapon systems necessary to maintain their performance level and to correct minor deficiencies identified through operational use.

Fiscal year 1973 planned program.—Continue to provide necessary in-service engineering assistance for the Terrier, Tartar, Tartar-D and Talos Weapon Systems, and the standard missile Program.

Program to completion.—After FY 1973 the following work will be accomplished under P.E. 64352, Surface Launched Weaponry Sys/Tech (ENG): range support and missile flight evaluation, ship test and evaluation of improvements, safety improvements including radiation hazard studies, system integration, and correction of deficiencies as identified through operational use.

Resources:	*Dollars in thousands*
R.D.T. & E.N. funds:	
Fiscal year 1971	7,731
Fiscal year 1972	5,396
Fiscal year 1973	1,693
Additional to completion	NA
Total estimated cost	NA

SURFACE DEFENSE SYSTEMS

Chairman ELLENDER. I note in the descriptive summary that this program is designed to assure maintenance of the surface launched guided missile fleet in combat readiness and that the principal missiles being supported are the Terrier, Tartar, Talos, and Standard missiles. If I remember correctly, the Terrier and Tatar missiles are gradually

being replaced by the Standard missile. Will this result in any changes being made in this program?

Dr. FROSCH. The program supports the shipboard fire control systems associated with these missiles, as well as the missiles themselves and although extended-range and medium-range versions of the Standard missile are replacing Terrier and Tartar missiles respectively, the systems associated with them are not being replaced and the requirement for support of these systems will remain.

Chairman ELLENDER. I note that the sum requested for fiscal year 1973 is approximatey $3.7 million less than the sum provided for fiscal year 1971. What accounts for this substantial decrease?

Dr. FROSCH. Prior to fiscal year 1968, all 3T missile and weapon system development effort was supported by this project. This included fleet support and "get well" improvements. Starting in fiscal year 1968, a 3T major system development project was established to support all major development modifications. Since that time the Navy has gradually reduced the fleet support and minor improvement effort under the surface missile system project and it will be completely phased out after fiscal year 1973.

Senator YOUNG. Please comment briefly on your planned program for fiscal year 1973.

Dr. FROSCH. The $1.7 million in fiscal year 1973 will provide necessary inservice engineering assistance for Terrior, Tartar, Tartar D, and Talos weapon systems, and the Standard missile program. Primary areas of efforts are (1) range support and missile flight evaluation; (2) correction of deficiencies as identified through operational use; (3) ship test and evaluation of improvements; and (4) integration of weapon system modifications.

SURFACE-LAUNCHED WEAPONRY, SYSTEMS AND TECHNOLOGY

Chairman ELLENDER. Of the total requested for fiscal year 1973, $7 million is for the progrem entitled "Surface-launched weaponry, systems and technology (advanced)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Category: Advanced development—Title: Surface launched weaponry, systems technology (Advanced); Budget activity: 3-missiles and related equipment.

Description: The increasing complexity of acquisition and tracking has developed a requirement to increase the effectiveness and flexibility of both gun and missile systems against a wide variety of targets than is currently possible. In gun systems this is to be accomplished using guidance and control dispersion errors. The need to reduce miss distance for all current gun systems has been amply demonstrated and as the warhead delivery range capability increases, the need will become even greater. Although excellent guidance and control systems exist now for use in missiles, no guided projectile is currently available for fleet use. The lack of an economical guidance and control capability for projectiles has placed the entire delivery accuracy burden on the gun mount, meteorological data acquisition, navigation, and gun to target range determination. A guidance and control system for projectiles will be developed. Using the Improved Point Defense Surface Missile System (IPDSMS) as a baseline an Advanced Point Defense Missile [deleted] will be developed. [Deleted.] A surface-to-air missile to replace the operational Standard Missile will begin development in the mid 1970's. The Ship Anti-Missile Integrated Defense (SAMID) program is providing integrated improvements to the capability of existing ships to enable them to enhance their effectiveness against the anti-ship missile threat.

Work performed by.—NWL Dahlgren is the lead laboratory in the gun program. Texas Instruments of Dallas, Texas is the contractor who will provide a semi-active laser guidance system for initial feasibility tests. SAMID/ASMD development tasks has been performed by federal laboratories and the following contractors: Vitro Corporation of America, Sanders Associates, Dynell Corporation, Sylvania, RCA, Sperry, Raytheon, General Dynamics, ITT, Logicon, Univac, Systems Consultants, AAI, Huges and Texas Instruments.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—The Guided Projectile program enters advanced development. SAMID completes at-sea evaluation of ASMD suit and continues development work in radar detection systems. Improved gun and missile systems interfaces and threat information correlation.

Fiscal year 1973 planned program.—[Deleted.]

Program to completion.—The Guided Projectile program will continue [deleted].

Resources:	*Dollars in thousands*
R.D.T. & E.N. funds:	
Fiscal year 1971	2,300
Fiscal year 1972	4,202
Fiscal year 1973	7,032
Additional to completion	Continuing
Total estimated cost	NA

SURFACE-LAUNCHED WEAPONRY, SYSTEMS AND TECHNOLOGY

Chairman ELLENDER. Of the total requested for surface-launched weaponry, I note that $6 million is for the project entitled "Projectile guidance". Will you give us a brief, unclassified description of this project?

Dr. FROSCH. The projectile guidance program will provide a very accurate projectile utilizing terminal homing techniques. This program will greatly increase the capability of existing guns at a cost less than that of replacement with a comparable missile system.

Senator YOUNG. I note in the descriptive summary that the Army is also engaged in work in this field. How are your efforts coordinated with those of the Army?

Dr. FROSCH. At this time a development concept paper is being prepared by action officers of the Navy, Marine Corps, and Army. This effort has resulted in an exchange of information and coordination at top levels as well as between the Naval Weapons Laboratory and the U.S. Army Missile and Weapons Commands. The U.S. Army has evidenced the intent of sending a liaison officer to the Naval Weapons Laboratory to monitor the Navy effort.

Chairman ELLENDER. Is all of the work on this project performed in Navy inhouse facilities?

Dr. FROSCH. All of the projectile guidance design work is being done at the Naval Weapons Laboratory, Dahlgren, Va., with components built to Navy specifications by industry.

Chairman ELLENDER. Can you give us a brief, unclassified description of planned program for fiscal year 1973?

Dr. FROSCH. The fiscal year 1973 effort will include the design, fabrication, and test firings of test projectiles and components.

Senator YOUNG. Why do you need the large increase of $4.2 million you are requesting?

Dr. FROSCH. Success achieved in the past 12 months led to expanding the program to additional applications. [Deleted.]

SHIP ANTIMISSILE INTEGRATED DEFENSE

Chairman ELLENDER. Of the total requested for surface launched weaponry, $1.1 million is for the project entitled "Ship anti-missile integrated defense", known as Samid. Can you give us a brief unclassified description of this project?

Dr. FROSCH. The objectives of the ASMD program are to develop equipment to improve the capability of surface ships in countering and defending against antiship missile attack. These improvements require effort in improving target detection, classification, and identification with passive and active sensors. In addition, effort is directed toward integrating sensors, weapons, and command and decision hardware/software to permit efficient decisionmaking and provide a threat reactive, integrated combat system. These improvements will greatly enhance flexibility and reliability of the ship's response to the antiship missile threat. The ASMD fiscal year 1973 R.D.T. & E. program will continue to develop and to test concepts requirements, and hardware to provide these improvements.

Senator YOUNG. Does the Samid program involve the installation of new antimissile equipment on ships or an upgrading of existing equipment?

Dr. FROSCH. The Samid program provides new equipments and also upgrades selected equipments aboard ship to enhance the overall capability of the ship to counter the antiship missile. New and existing equipments are integrated through command and control techniques to enable a threat reactive or rapid response to attack.

Chairman ELLENDER. What do you plan to do with the $1.1 million you are requesting for fiscal year 1973, and will you comment on the reason for the decrease of $1.3 million on this program under the amount provided for fiscal year 1972?

Dr. FROSCH. Fiscal year 1973 funds will support the land-based test and evaluation of a major command and control improvement for guided missile destroyers (DDG). This test and evaluation will prove the interfacing and integration of the weapons, sensors and command and control systems to achieve an increased antiship missile defense capability and enhance overall ship combat performance. In addition, funds will support planning for operational evaluation of this command and control system and other antiship missile defense equipments for service approval. In fiscal year 1972 required funding provided for operational evaluation or at-sea testing and land-based testing of antiship missile defense equipments and systems aboard two major combatants and at the Mare Island test site. In addition, fiscal year 1972 funds were required for the development of command and control hardware to be used in the DDG system discussed above. During fiscal year 1973 the requirements for test and evaluation are reduced from the fiscal year 1972 level and this reduction is reflected in the budget requirement.

AIR-TO-GROUND WEAPONS TECHNOLOGY (ADVANCED)

Chairman ELLENDER. Of the total requested for missiles and related equipment, $7.3 million is for the program entitled "Air-to-ground weapons technology (advanced)." Selected paragraphs from the descriptive summary will be included at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Category: Advanced development—Title: Air to ground weapons technology (Advanced); Budget activity: 3-missiles and related equipment.

Description.—Advanced Anti-Personnel/Anti-Material (APAM) Cluster Weapon is comprised of the MK–7 universal dispenser and [deleted] target discriminating bomblets. Air to Surface (ASM) Guidance and Propulsion Technology includes the Air-Launched Low Volume Ramjet (ALVRJ) and the Advanced Tactical Inertial Guidance System (ATIGS). The Lightweight (LTWT) 20MM Gun Pod is designed primarily for air-to-ground use when carried on helicopters and observation-type, fixed-wing aircraft.

Work performed by:

APAM: Naval Weapons Center, China Lake, California; Honeywell, Minneapolis, Minnesota.

ALVRJ: Naval Weapons Center, China Lake, California; Vought Missile and Space Company, Dallas, Texas; United Aircraft Research Laboratories, East Hartford, Connecticut.

ATIGS: Naval Weapons Center, China Lake, California; Honeywell, Minneapolis, Minnesota; Raytheon Company, Sudbury, Massachusetts.

Lightweight 20MM Gun Pod: Naval Weapons Center, China Lake, California; General Electric Company, Burlington, Vermont.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAM

Fiscal year 1971 and prior accomplishments: Completed major portion of advanced development of APAM. Completed design of dynamic test vehicle for ALVRJ. Breadboard model and computer simulation developed for ATIGS. Manufactured prototype LT WT 20MM Gun Pods.

Fiscal year 1972 program.—Conduct environmental safety, flight and functional tests of APAM, including technical and operational evaluation. Complete integrated system design for ALVRJ. Ground test propulsion system. Captive flight ATIGS breadboard model. Let contract for experimental missile configured ATIGS. Initiate aircraft compatibility and ship suitability tests for LT WT 20MM Gun Pod.

Fiscal year 1973 planned program.—[Deleted.] Ground test ALVRJ dynamic test vehicle. Perform acceptance tests of ATIGS flight test model. Complete helo and OV–10 aircraft evaluation of LT WT 20MM Gun Pod.

Program to completion.—Define modular system concept based on ALVRJ and ATIGS with different warhead and guidance options.

RESOURCES

[Dollars in thousands]

	Fiscal year—			Additional to completion	Total estimated cost
	1971	1972	1973		
R.D.T. & E., N. funds:					
APAM	1,625	1,250	500	Continuing	(1)
ASM	3,130	4,270	6,275	do	
LT WT 20MM	1,547	740	500	do	
Element	6,302	6,260	7,275		

[1] Not available.

Chairman ELLENDER. Would you provide a tabulation for the record listing the projects funded under this program, the amounts for fiscal years 1971 and 1972 and the request for fiscal year 1973?

Dr. FROSCH. I will be glad to do so.

(The information follows:)

[In thousands of dollars]

Project No.	Title	Fiscal year— 1971	1972	1973
W1133	Antipersonnel/antimaterial (AP/AM) cluster munitions	1,625	1,250	500
W1156	Air-to-surface missile guidance and propulsion technology	3,130	4,270	6,275
W1190	Lightweight 20 mm. gun pod	1,547	740	500

Senator YOUNG. Of the total requested, $500,000 is for a project entitled "Antipersonnel/antimaterial cluster munition." Would you comment on the decrease of $700,000 in your request for fiscal year 1973?

Dr. FROSCH. Realinement of priorities together with early completion of a rather austere development program permitted this decrease.

Chairman ELLENDER. Of the total requested, $6.3 million is for a project entitled "Air-to-surface missile guidance and propulsion technology." Give us a brief description of this project.

Dr. FROSCH. This project involves two separate but related efforts—the development of advanced tactical inertial guidance (ATIGS) technology and air launched low volume ramjet (ALVRJ) technology. Both of these technologies are applicable to the development of an advanced tactical standoff air-to-surface missile system for operational use in the post-1977 threat environment.

Senator YOUNG. What are the objectives of your program for fiscal year 1972?

Dr. FROSCH. In fiscal year 1972 we have completed the integrated system design for the air-launched low-volume ramjet and have initiated the fabrication of ramjet flight test units. Also, we are conducting captive flight tests of the advanced tactical inertial guidance breadboard models.

Chairman ELLENDER. I note that the program for fiscal year 1973 is over $2 million more than the funds provided for fiscal year 1972. Please comment on this.

Dr. FROSCH. The increased funding requested in fiscal year 1973 reflects the increased importance that I feel this project warrants especially the air-launched low-volume ramjet effort. The increase will insure a viable program and should lead to an earlier availability of these critical technologies.

Senator YOUNG. What are the objectives of your planned program for fiscal year 1973?

Dr. FROSCH. In fiscal year 1973 we plan to ground test the ramjet dynamic test vehicle, initiate the ramjet flight-test program, and conduct flight tests of the advanced tactical inertial guidance test models.

Chairman ELLENDER. $500,000 is for the project entitled "Lightweight 20-mm. Gun Pod." Describe this project and tell us what you plan to do with the funds you have requested for fiscal year 1973.

Dr. FROSCH. This item is a lightweight 20-mm. gun pod for external carriage on helicopters and OV–10 aircraft. It also can be modified to provide a greater rate of fire for jet aircraft use. The fiscal year 1973 funds are for safety certification, environmental and shipboard testing, and Opeval.

AGILE AIR-TO-AIR MISSILE

Chairman ELLENDER. The request includes $26.1 million for the continuation of the development of the Agile air-to-air missile system. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

AIR-LAUNCHED WEAPONRY, SYSTEMS AND TECHNOLOGY (ADVANCED)

Background.—Sparrow and Sidewinder missiles used during the air war in South East Asia (SEA) were not designed for air combat maneuvering (Dogfight) situation. Development efforts directed at improving dogfight performance are on-going; however, growth potential of these missiles will fulfill the near term requirement only. As a result AGILE development effort commenced in 1968 to provide dogfight missiles to combat air threat in 1980 time frame.

Description.—Program will develop new short range, highly maneuverable dogfight missile. AGILE missile concept is wingless vehicle utilizing jet reaction or vectored thrust control in lieu of aerodynamic control; however, aerodynamic control approaches are under study as a back-up design. Wingless missile will provide order of magnitude improvement in maneuverability. AGILE design includes new seeker to provide vastly improved detection capability regardless of target aspect. AGILE development also includes new [deleted]. AGILE missile will be compatible with current fighters and attack aircraft as well as the F–14 and F–15. [Deleted.]

Work performed by:

NAVWPNSCEN, China Lake, Calif.
NAVMISCEN, Pt. Mugu, Calif.
NSRDC, Carderock, Md.
AEDC, Tullahoma, Tenn.
Hughes Aircraft Co., Canoga Park, Calif.
Grumman Aerospace Corp., Bethpage, N.Y.
TRW Inc., Redondo Beach, Calif.
Philco-Ford Corp., Aeronutronics Div., Newport Beach, Calif.
McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
Thiokol Chemical Corps., Wasatch, Brigham City, Utah
Lockheed Propulsion Co., Redlands, Calif.
Booz-Allen Applied Research, Inc., Bethesda, Md.
LTV Corp., Dallas, Tex.

Fiscal year 1972 program.—Series of six FTV tests will be initiated by third quarter FY 1972. One ground launch and three air launches will be completed in FY 1972. Purpose of these tests is to evaluate movable nozzle TVC in baseline airframe in programmed flight. Hardware for follow-on experimental test vehicles (XTV) will be fabricated, and sled tested. Analyses, for engineering test vehicles (ETV) will be completed and preliminary detailed designs started. Advanced design seekers will be delivered by Hughes Aircraft Co. and Philco-Ford and evaluations begun. Analysis of F–4J tactical avionics for Agile will be completed and baseline configuration synthesized.

Fiscal year 1973 planned program.—FTV tests planned for completion in October 1972. XTV series of tests will be started. Purpose is to evaluate baseline airframe and propulsion steering unit with seeker. These will be the last Advanced Development vehicles. [Deleted.]

Target acquisition avionics analysis will be completed. Improved visual target acquistion Advanced Development models will be ground and flight tested. Agile seeker will be selected and procurement for ETV tests started. Rocket motor and propulsion steering specifications will be completed. Warhead qualification tests will be completed. These developments will essentially complete Concept Formulation for Agile.

Program to completion.—Release to Engineering Development planned for [deleted]. Fuze qualification tests, launcher qualification tests, and seeker operational and environmental tests will be completed. In [deleted] tests will be complete on 15 Engineering Development Models, and release to prototype production

will occur. In [deleted] initial release to pilot production planned. By [deleted] release to full production will occur upon successful completion of Operational Evaluation (OPEVAL).

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971 and prior, 17,708; fiscal year 1972, 22,090; fiscal year 1973, 26,100; additional funds to completion are [deleted]; and the total estimated cost is [deleted].

AGILE AIR-TO-AIR MISSILE

Chairman ELLENDER. What is the objective of this effort?

Dr. FROSCH. To develop an advanced short-range highly maneuverable passive air-to-air missile for use in the air combat maneuvering situation (dogfight) during the 1980 time frame. The Agile concept is a wingless vehicle utilizing thrust vector control in lieu of aerodynamic control. The missile project includes a new seeker to provide vastly improved detection capability regardless of target aspect. The Agile development also includes [deleted].

Senator YOUNG. Tell us exactly what you plan to do with the $26.1 million you are requesting for fiscal year 1973.

Dr. FROSCH. A series of ground and air firings of Agile test vehicles will be fired to evaluate the baseline design and propulsion steering unit with a missile seeker. These will be the last advanced development vehicles and will provide comparison between [deleted] in a free flight environment. Target acquisition avionics and visual target acquisition models will be ground and air tested. An Agile seeker will be selected, and procurement for engineering development test vehicles will commence. Rocket motor, propulsion steering, and warhead and fuze qualifications will also be completed. These development efforts will essentially complete concept formulation which will be the basis for commencement of engineering development commencing in fiscal year 1974.

Chairman ELLENDER. I note that the current total estimated cost of the Agile development program is $216.7 million. How does this compare to the original total estimated cost?

Dr. FROSCH. The original estimate for the Agile program was $137 million. However, this amount was for the development of a missile alone. The current estimate of [deleted] million is for a total weapon system development, including aircraft avionics.

Senator YOUNG. What improvements will you have in the Agile missile that you will not have in this new dogfight version of the Sidewinder missile?

Dr. FROSCH. The Agile missile will possess substantially greater capability in [deleted].

Chairman ELLENDER. Under your current thinking, what Navy and Air Force aircraft would carry the Agile missile?

Dr. FROSCH. The F–4, F–14, F–15, A–6, and A–7 aircraft.

Senator YOUNG. When do you expect this new missile to become operational?

Dr. FROSCH. The planned initial operational capability of the Agile missile is [deleted].

DEFENSE SUPPRESSION WEAPON TECHNOLOGY

Chairman ELLENDER. $7.3 million is requested for a program entitled "Defense Suppression Weapon Technology (Advanced)." Please provide a brief unclassified description of this program for the record.

Dr. FROSCH. This program has the objectives of providing the critical technologies from which systems can be developed to suppress and/or destroy enemy radars. This includes the systems in aircraft and in antiradiation missiles. As you know, the field of electronic warfare is never stagnant. Enemy radars (and ours) constantly incorporate newer technologies to improve their performance and their resistance to countermeasures. This program keeps abreast of these developments and provides the means to lethally counter them should the need arise. It therefore includes both a technology program and a hardware program which capitalizes on the technology developed.

Chairman ELLENDER. There are two projects funded under this program element. The first is entitled "Advanced Antiradiation Missile-Target Identification and Acquisition Systems Technology" for which you are requesting $2.2 million. This $2.2 million is $750,000 less than the funds provided in fiscal year 1972. Comment on this for us, please.

Dr. FROSCH. I will be glad to do so. The situation is caused not so much by a decreased need for funds in this program as it is by increased needs for R. & D. funds in other programs. Accordingly, I have reductantly found it necessary to constantly "scrub" a host of R. & D. programs in order to properly maintain the developmental progress of a few ongoing hardware programs. The technology program entitled "Advanced Antiradiation Missile-Target Identification and Acquisition Systems Technology" is one of those that I have had to reduce fiscal year 1973 funding.

Chairman ELLENDER. The second project being funded under this program is entitled "High-Speed Antiradar Missile" for which you are requesting $5.1 million. What are the objectives of this program, and what will you do with the $5.1 million you are requesting?

Dr. FROSCH. This is the hardware program that capitalizes on the technologies developed in the other project under the defense suppression title. It includes an advanced antiradiation missile which corrects the operational deficiencies of Shrike and Standard ARM, and an aircraft avionics suit which is suitable for wide usage in our tactical aircraft and permits full utilization of the capabilities of the antiradiation missile.

The enemy has developed (and is continuing that effort) increasingly sophisticated surface-to-air missile systems. If our aircraft are asked to operate in an environment of enemy surface-to-air missile systems, we must possess the means to suppress and/or destroy their associated radar systems. Therefore, the $5.1 million of fiscal year 1973 R. & D. funds in the high-speed antiradiation missile program develops experimental missile seekers, a propulsion and control system, flight-tests them, and investigates various aircraft avionics systems for applicability.

Senator YOUNG. Why do you need the increase of $1.1 million for fiscal year 1973?

Dr. FROSCH. The fiscal year 1973 budget contains $1.1 million more than the fiscal year 1972 budget because a greater level of effort will be conducted. Moreover, these first 2 years of funding will largely define the direction this advanced development program will proceed.

ADVANCED CRUISE MISSILES

Chairman ELLENDER. The request includes $16 million for the program entitled "Advanced Cruise Missiles." Generally speaking, what is the objective of this program?

Dr. FROSCH. This program has been split into two individual (but closely related both technically and operationally) projects: the encapsulated Harpoon missile and the advanced cruise missile. The objectives of these projects are:

Encapsulated Harpoon missile: Provide existing attack class nuclear submarines with a standoff antisurface ship weapon which has a range [deleted] compatible with the sensors presently available and which will be highly effective against ships operating singly or in task formations.

Advanced cruise missile: [Deleted.]

Chairman ELLENDER. I call the members' attention to the information on pages 251–254 of the descriptive summary on this program. In view of the fact that practically all of the information on this program is classified, I will not include any of the descriptive summary material in the record. Would you comment generally on what you plan to do with $2 million of this $16 million request that is for advanced missiles?

Dr. FROSCH. The $2 million will be utilized primarily for studies to be conducted by Navy laboratories. These efforts will encompass:

(*a*) System tradeoffs studies.
(*b*) Weapon system design studies.
(*c*) Booster/threat vector control design studies.
(*d*) Warhead/fuze requirements determination studies.
(*e*) Test launcher design studies.
(*f*) Scale model tests.
(*g*) Fire control interface/integration studies.

WEAPONIZING OF SHIPS

Chairman ELLENDER. Of the total requested for missiles and related equipment, $6 million is for a program entitled "Weaponizing of Ships." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

WEAPONIZING PROTOTYPES (ADVANCE)

Background.—The Navy has urgent need for much lighter weight weapon systems for ships. The need is particularly acute for smaller ships and craft such as fast patrol boats, surface effect ships and hydrofoils. The Navy Advanced Prototype Program will evaluate promising lightweight weapon concepts by prototype demonstration.

Description.—Minimum cost and minimum time approaches are essential to this development prototyping. Hardware prototypes will be oriented toward technology rather than full compliance with many requirements essential to a full engineering development. Thus, risk prior to start of engineering development will be reduced and permit validation through hardware demonstration prior to extensive commitment.

Work performed by.—Not available at this time.

Program accomplishments and future programs:

Fiscal year 1972 program.—In the light weapon area, 32 proposals from both industry and Navy laboratories were received in response to Area of Interest letters. An evaluation of these proposals resulted in 7 particularly attractive areas for lightweight weapon prototyping. These include: Lightweight Missile, vertical launch of Standard missile, lightweight small craft gun, passive fire control, [deleted] fixed round simple torpedo and a torpedo homing system. Design and fabrication of selected hardware prototypes will commence in fiscal year 1972.

Fiscal year 1973 planned program.—Continue fabrication of selected prototypes and start test and evaluation.

Program of completion.—Future prototyping will be conducted as proposals are received and evaluated.

Resources (in thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971 and prior 0; fiscal year 1972, 500; fiscal year 1973, 6,000; additional funds to completion are continuing; and the total estimated cost is continuing.

Weaponizing of Ships

Chairman Ellender. Please describe your efforts under this program in fiscal year 1972.

Dr. Frosch. A notice was published by the Navy in the November 18 and 19, 1971 issues of the Commerce Business Daily requesting proposals for prototyping. Approximately 40 weaponizing proposals were received from both industry and Navy laboratories. These proposals are being evaluated and current plans are to support those programs adjudged to have the greatest potential for development. A major goal is the prototyping of weapons for new type hulls such as the surface effect ship.

Senator Young. What are your objectives for fiscal year 1973?

Dr. Frosch. In fiscal year 1973, the Navy plans to initiate several of the programs which have been submitted and recommended as high potential concepts as well as to carry to conclusion the one or possibly two programs that the Navy plans to initiate in fiscal year 1972.

Chairman Ellender. This program apparently began in fiscal year 1972, and $500,000 was provided for that fiscal year. For fiscal year 1973, you are requesting $6 million. Please comment on the need for this very large increase.

Dr. Frosch. The $500,000 for fiscal year 1972 is intended to get the weaponizing program underway. A reprograming action was initiated to make this money available to start the program. As of today that reprograming action is awaiting congressional approval. The Navy's plans are to implement the weaponizing program in late fiscal year 1972 by starting one or possibly two of the most promising programs that were recommended for funding. The major portion of the program or programs initiated in fiscal year 1972 would be funded with 1973 money. Additionally, as I have mentioned, the Navy desires to implement other programs in fiscal year 1973 which accounts for the substantial increase in required funding.

Harpoon Antiship Missile

Chairman Ellender. The request includes $58,265,000 for the continuation of the development of the Harpoon antiship missile. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

Fiscal Year 1973 R.D.T. & E. Descriptive Summary

Antiship weaponry (advance)

Background.—The impressive Soviet bloc success in operational deployment of a sophisticated mix of air-launched and ship-launched anti-ship missiles represents a major tactical threat to US Naval forces at sea, and a very real strategic threat to US control of the seas.

The optimum means of destroying the threat has been the subject of years of intense study, debate, and planning within the Navy. These efforts have culminated in a program to equip US aircraft and ships with a lethal anti-ship missile system, the Air-Launched/Ship-Launched Anti-Ship Missile System (HARPOON).

Description.—The HARPOON Weapon System consists of a missile, an aircraft command and launch subsystem, a shipboard command and launch subsystem, and support equipment required to provide for the handling and testing of the system.

The Harpoon missile uses an active radar seeker, [deleted]. The missile is propelled by a turboject sustainer, augmented by a solid booster for ship launch. The missile is standard 13.5-inch diameter. Length and weight (1100 pounds for air-launch and 1400 pounds for ship-launch) are such that it is compatible with TARTAR, TERRIER, and ASROC ship launchers, as well as aircraft launchers.

Aircraft Command and Launch Subsystem is structured around a HARPOON dedicated fire control system which utilizes a digital computer. A missile control panel is added to provide those command, control, and display functions not available from existing aircraft equipment. Launch control is achieved through minimum modifications to the present aircraft armament control subsystem.

Ship Command and Launch Subsystem is also structured around a HARPOON dedicated fire control system which utilizes a digital computer. A HARPOON indicator panel, will provide HARPOON status for the launch operator. This subsystem interfaces with and shares displays, launch control panels, and launchers with existing ship weapon systems.

Work performed by.—Naval Avionics Facility, Indianapolis, Indiana; Naval Weapons Center, China Lake, California; Naval Weapons Laboratory, Dahlgren, Virginia; Naval Research Laboratories, Washington, D.C.; Applied Physics Laboratory, The Johns Hopkins University, Silver Spring, Maryland; McDonnell Douglas Corporation; Texas Instruments Inc.; Sperry Rand Corporation; Aerojet Solid Propulsion Co.; Airesearch of Garrett Corp.; and Teledyne CAE.

Program accomplishments and future programs:

Fiscal year 1972 program.—Design of a Harpoon missile and associated air and shipboard equipments will take place. Preliminary Design Review will begin in the mid-part of the fiscal year. Fabrication of special support equipment and modification of a ship and aircraft launch platform will begin. A single jet engine contractor will be selected. Special flight test vehicles, including missiles for launcher test, guidance test, aerodynamic test and jettison tests will be under construction.

A fiscal year 1972 supplemental funding of $2 million additional is required to meet expenses to be incurred in supporting the testing and design to make necessary modifications to Harpoon missiles to accommodate encapsulated launch without degrading the performance in the air and surface launch modes.

Fiscal year 1973 planned program: [Deleted.]

Program to completion.—The Weapon System Development phase where 50 prototype missiles will be developed and tested, will be completed by [deleted]. In this phase Contractor Technical Evaluation, Navy Technical Evaluation and Operational Evaluation will be accomplished. Phase 4, the Pilot Line Phase, will commence [deleted] and will provide [deleted] pilot line missiles for use in the Navy operational evaluation program and first fleet introduction. This phase will be followed by continued production to meet inventory requirements. IOC (Initial Operational Capability) is programed for [deleted].

Milestone plan for Harpoon weapon system

1.	Initiate development (validation phase)	March 1970
2.	Award engine advanced development contract	February 1971
3.	Award design phase contract	June 1971
4.	Initiate captive seeker tests	[deleted]
5.	First control test vehicle launches	[deleted]
6.	First guidance test	[deleted]
7.	Complete 4 successful guidance test vehicle launches	[deleted]
8.	Award weapon system development contract (1)	[deleted]
9.	First prototype missile launch	[deleted]
10.	Award pilot line production contract	[deleted]
11.	Complete contractor test of prototype missile	[deleted]
12.	Start Navy technical evaluation	[deleted]
13.	Start OPEVAL [deleted] & DE–1052)	[deleted]
14.	Complete OPEVAL [deleted] & DE–1052)	[deleted]
15.	Approval for service use (Missile [deleted] & DE–1052)	[deleted]
16.	First delivery to fleet	[deleted]
17.	IOC [deleted] & DE–1052)	[deleted]
18.	Award first production contract	[deleted]
19.	IOC (other platforms)	[deleted]
20.	Accept first production missile	[deleted]

Resources (in thousands of dollars:)

R.D.T. & E.N. funds fiscal year 1971 and prior, $27,700; fiscal year 1972, $38,530[1]; fiscal year 1973, $58,265.

Chairman ELLENDER. As I understand, this missile will have the capability of being launched from aircraft and ships. Am I correct about this?

Dr. FROSCH. Yes, sir; you are correct. The only difference between the air-launched and ship-launched Harpoon is the need for a booster rocket in the ship-launched version.

Senator YOUNG. Tell us exactly what you plan to do with the $58.3 million you are requesting for fiscal year 1973.

Dr. FROSCH. The program is approaching the midway point of its 2-year engineering design phase. [Deleted.]

Chairman ELLENDER. I note that the total estimated cost of this effort is now stated at [deleted] million. How does this compare to your original total estimated cost?

Dr. FROSCH. There is no change. The original estimate is the same as the current estimate.

Senator YOUNG. What ships would have the capability to launch the Harpoon missile?

Dr. FROSCH. Initial Harpoon capabilities will be provided to ships not presently equipped with guided missiles with the DE–1052 class ships designated as the first to be configured. These will be followed by installations aboard other nonmissile destroyer types and then Harpoon will be provided to the guided-missile ships (DEG's, DDG, DLG's, DLG(N)'s, CG's, and one CGN). Currently, [deleted] ships are scheduled to be Harpoon configured by fiscal year [deleted].

Chairman ELLENDER. What aircraft would have the capability to launch the Harpoon missile?

Dr. FROSCH. Initially, [deleted] will have the Harpoon capability followed by the [deleted]. We are also considering the A6 and A7 aircraft as possible launch platforms.

Chairman ELLENDER. Will any major modifications be required for those ships that will carry the Harpoon missile?

[1] Includes $2.0 million requested in fiscal year 1972 supplemental.

Dr. FROSCH. No, sir; modifications to the ships will be relatively minor since the Harpoon weapon system is being designed to interface with and share displays, launch control panels, and launchers with existing ship weapon systems.

Senator YOUNG. I note that, after fiscal year 1973, you expect to require an additional [deleted] for this effort. When do you expect this missile to become operational on aircraft and ships?

Dr. FROSCH. The initial operational capability for both aircraft and ships is scheduled for [deleted].

Chairman ELLENDER. When will the Congress have to make a production decision on the Harpoon missile?

Dr. FROSCH. The decision will be required in fiscal year [deleted] for the start of a [deleted] missile pilot production followed by full production in fiscal year [deleted].

SURFACE-LAUNCHED WEAPONRY, SYSTEMS, AND TECHNOLOGY

Chairman ELLENDER. Of the total requested for missiles and related equipment $62.4 million is for a program entitled "Surface-Launched Weaponry, Systems, and Technology (Engineering)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

tegory: Engineering Development

Title: Surface Launched Weaponry, Systems and Technology (Engineering)

Budget Activity: 3-Missiles and Related Equipment

SCRIPTION: The engineering development of shipboard gun and guided missile systems as well as tactical ta system and displays is carried out under this program element. The primary thrust of effort is rected toward the improvement of fleet air defense through the development of engineering models and rototypes which will lead to the early introduction of improved air defense systems. Some of the developents to improve the performance of our task forces' outer perimeter defense include improvement to the TANDARD Missile and TARTAR and TERRIER systems installed on destroyers, frigates and cruisers; and evelopment of tactical data systems and displays for ships ranging in size from destroyers to aircraft arriers. The development of the NATO SEASPARROW surface missile system with its target acquisition system ill bolster the Navy's point defense capability. To provide a close-in defense to engage those targets hich leak through the task force's outer defenses the Phalanx Close-in Weapon system--a high rate of fire un coupled with a closed loop fire control system--is being developed.

ORK PERFORMED BY: General Dynamics, Calif; Raytheon Company, Mass.; Northern Ordnance/FMC Corporation, ; Sperry Rand Corporation, New York; Hughes Aircraft Company, Calif.; Naval Ship Missile ystems Engineering Station, Calif.; Applied Physics Laboratory, John Hopkins University, Md; Naval Weapons enter, China Lake, Calif.; Univac Div of Sperry Rand, Minn.; Collins Radio Corporation, Texas; Naval lectronics Lab, San Diego, Calif; Mare Island School Command, Calif.;

COMPLISHMENTS & FUTURE PROGRAM

FY-72 Program: Four STANDARD Missiles control test vehicles with mid-course gu[illegible] modifi[illegible]ons will be flight tested and the development of shipboard modifications to accommodate [illegible] missiles [illegible] be initiated. An engineering development model of the Phalanx close-in weapon system will complete environmental and performance tests. Tests will be initiated on two prototypes of the AAW[illegible] guided missile launching system. The technical evaluation of the NATO SEASPARROW surface missi[illegible]stem will complete and the fabrication of two engineering development models of a target [illegible]ion [illegible]m will commence. Prototype large screen displays are now at sea for evaluation.

FY-73 Planned Program: Technical evaluations will be completed on the Phalanx system as well [illegible]on the two versions of the STANDARD surface-to-surface missile--anti-radiation and active seeker. SEASPARROW surface missile system will complete an operational evaluation. Work will continue on development of electronic counter counter measure improvements to the TARTAR and TERRIER systems. [illegible]light

tests of STANDARD development prototype missiles with mid-course guidance modifications will be completed. Complete fabrication of two engineering development models of the target acquisition system. Complete testing of the two MK 26 guided missile launching system prototypes. The first small ship integrated combat system (TARTAR/Junior Participating Tactical Data System) will be installed on a guided missile destroyer.

4. Program to Completion: Conduct operational evaluation of target acquisition system components. Fabricate and flight test pilot production STANDARD Missiles with mid-course guidance modifications. Continue the development of engineering models and prototypes primarily to improve fleet air defense.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	37,963	53,501	62,349	Continuing	N/A

SURFACE-LAUNCHED WEAPONRY, SYSTEMS, AND TECHNOLOGY

Chairman ELLENDER. Please provide a tabulation for the record listing the projects funded under this program, the amounts for fiscal years 1971 and 1972 and the request for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

SURFACE-LAUNCHED WEAPONRY, SYSTEMS, AND TECHNOLOGY (ENG)

	Fiscal year—		
	1971	1972	1973
U1226—Close in weapon system (Phalanx)	8,200	14,615	8,922
U1227—Standard missile SSM (surface-to-surface)		11,037	15,135
U1744—Surface-to-air missile antimissile capability	6,778	6,391	5,430
U1746—Ultra-high frequency telemetry	618	503	506
U1747—NATO Seasparrow	9,150	5,750	2,434
U1748—Point defense improvements	3,452	5,322	21,103
U1750—Advanced ordanance package for standard missile	1,751	557	
U1756—Combined antiair warfare/antisubmarine warfare guided missile launching system (MK-26)	7,210	1,304	53
U1765—Standard missile (midcourse) guidance		6,589	4,960
S3118—Junior participating tactical data system	634	503	1,803
S3131—Automated status boards and large screen displays	70	930	2,003
S3145—Teletype data integrated display	100		
Total	37,963	53,501	62,349

PHALANX

Chairman ELLENDER. Of the total requested for surface-launched weaponry, $8.9 million is for a project entitled "Close-in weapon system (Phalanx)". Please describe your planned program for fiscal year 1973 and tell us what you hope to accomplish with the $8.9 million in funds requested?

Dr. FROSCH. During fiscal year 1973 prototype hardware will be completed and subjected to extensive testing. Two prototypes will be completed with one utilized in a test program to improve reliability and maintainability, and the other one will be installed on a destroyer class ship for an initial test and evaluation.

Senator YOUNG. $14.6 million was provided in fiscal year 1972 for Phalanx and you are requesting $8.9 million for fiscal year 1973. Have you completed some major efforts which allow this sizable decrease in funds requested?

Dr. FROSCH. Yes, sir; during fiscal year 1972 extensive tests of components were successfully conducted and the large portion of prototype fabrication was accomplished causing a funding surge.

Chairman ELLENDER. What types of ships will be equipped with the Phalanx?

Dr. FROSCH. Because of its small size and light weight, the Phalanx is suitable for almost all surface ships. Priority of installation will be given to the highest value ships.

Senator YOUNG. Have you reached a production decision as yet?

Dr. FROSCH. Within the next 2 months we will be asking for a production decision addressing the first nine production prototype units to be built in fiscal year 1973. The major production decision concerning fiscal year 1974 funds will not come until next year after an extensive program of testing the initial units.

Chairman ELLENDER. $15 million is requested for the project entitled "Standard Missile SSM (Surface-to-Surface)." Describe this objective of this project.

Dr. FROSCH. [Deleted] surface-to-surface missile capability is urgently required until the Harpoon missile is deployed in substantial numbers. This capability is required to combat Soviet missile-equipped ships. A requirement exists to defend task forces against surprise attack by trailing Soviet ships, and it is also important that deployed forces have a credible capability to counter equivalent enemy surface forces in the absence of nearby carrier aircraft. The semiactive Standard missile is in inventory at this time and provides an antiship capability to guided missile destroyers and frigates, but requires radar illumination of the target by the firing ship for semiactive homing out to the radar horizon. In addition, six DE–1052 class ships and two gunboats (PG 86 and 87) are being modified to provide a capability to engage surface targets with the semiactive Standard missile.

Chairman ELLENDER. What additional capabilities are you hoping to develop for this missile over the Standard missile already in the inventory?

Dr. FROSCH. [Deleted.]

Senator YOUNG. Is any of the work on this project being done by one of the Federal Contract Research Centers?

Dr. FROSCH. Yes, the Applied Physics Laboratory of the Johns Hopkins University is providing technical assistance.

Chairman ELLENDER. Have you met all of your major milestones to date in the development of this missile?

Dr. FROSCH. Yes, all major milestones have been met.

Senator YOUNG. Why do you need the increase of $4.1 million you are requesting for fiscal year 1973?

Dr. FROSCH. The requirement for the increase is due to a peak in developmental effort in fiscal year 1973. Following that, research and development funding requirements will decrease markedly, and the program will go into the production phase.

Chairman ELLENDER. $5.4 million is requested for the project entitled "Surface-to-Air Missile Antimissile Capability." Give us a brief description of this project.

Dr. FROSCH. [Deleted.]

Chairman ELLENDER. Is any of the work on this project being performed by one of the Federal contract research centers?

Dr. FROSCH. Yes; it is planned that technical support from the Applied Physics Laboratory, Johns Hopkins University, will be continued for this project.

Senator YOUNG. Comment on the decrease of $961,000 in your request for fiscal year 1973.

Dr. FROSCH. The funding for this project varies from year to year, depending on the specific improvements being developed. The decrease in fiscal year 1973 from that approved for fiscal year 1972 is primarily because of completion of most of the Terrier digital fire control system development. Also, Terrier acquisition tracking radar improvement was completed in fiscal year 1972.

Chairman ELLENDER. Of the total requested for surface-launched weaponry, $21.1 million is for the project entitled "Point Defense Improvements." Explain the relationship between this project and the NATO Seasparrow program.

Dr. FROSCH. The point defense improvement project provides for the development tests and evaluation of target acquisition system.

When the target acquisition system (TAS) is used with the NATO Seasparrow missile system, the combination becomes the U.S. Navy's improved point defense surface missile system. Briefly, TAS [deleted].

Senator YOUNG. Is any of the work on this project being performed by one of the Federal contract research centers?

Dr. FROSCH. Yes. It is planned that technical support from the Applied Physics Laboratory, Johns Hopkins University, will be continued in this project.

Senator YOUNG. Only $5.3 million was provided for this project in fiscal year 1972; and now for fiscal year 1973, you are requesting $21.1 million. Explain to us why you need this very large increase.

Dr. FROSCH. Engineering development of the target acquisition system hardware began in late November 1972. This project was planned at the $10.3 million level for fiscal year 1972. Following the approval of the appropriation at the $5.3 million level, all fiscal year 1972 effort was cut back to the approved level. This resulted in a slower startup on equipment design and caused deferral to fiscal year 1973 of some material procurement for fabrication of two engineering development models. The increase in fiscal year 1973 to $21.1 million is due to several factors.

The first, and principal, reason is that fiscal year 1973 is the first full year of engineering developments as compared to a little more than one-half year in fiscal year 1972. During the year, all subsystem equipments will complete fabrication, assembly, and environmental testing, in preparation for their later assembly and testing up to the complete system level. This is the heaviest portion of the development program in terms of hardware operations and manpower loading. Another reason for the fiscal year 1973 increase is the need for the active and close monitoring, review, technical direction, and approval by our Navy field activities of the prime contractor's design, fabrication, test, evaluation, and documentation efforts under the cost-plus-incentive-fee type of contract. [Deleted] as the equipment design is being finalized, we will initiate a system design integration effort in which the target acquisition system is combined with the missile or weapons systems and other associated shipboard equipments to yield a complete operational combat systems.

Chairman ELLENDER. $5 million is requested for the project entitled "Standard Missile [deleted] Guidance." Has the committee been furnished with complete information on this project?

Dr. FROSCH. Yes, sir; it has.

AIR-TO-GROUND WEAPON TECHNOLOGY (ENGINEERING)

Chairman ELLENDER. $515,000 is requested for the program entitled "Air-to-Ground Weapon Technology (Engineering)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

AIR-TO-GROUND WEAPON TECHNOLOGY (ENGINEERING)

Description.—Deneye: an air delivered anti-personnel/anti-vehicle land mine weapon system consisting of several hundred land mines to be delivered in a predictable pattern from a dispensing container. Upon impact the mine emplaces

itself on the ground surface and deploys triplines. The mines will self-destruct after a preset time has elapsed.

FAE II: a second generation Fuel Air Explosive Weapon to provide a follow-on weapon for existing FAE (CBU–55 and CBU–72). The major difference will be in removal of the present restrictions [deleted]. Upon recent guidance from the Office of the Director of Defense Research and Engineering (ODDR&E) the FAE II development will emphasize technology investigation rather than immediate weaponization, and will probably be moved back to a Category III Advanced Development effort.

Program accomplishments and future programs:

Fiscal year 1972 program.—Develop Deneye fuze, warhead and target detecting device, including battery tests, mine/dispenser interface and systems reliability analysis. Develop Fuel Air Explosive (FAE) technological base to identify problems associated with fuel dissemination and cloud detonation.

Fiscal year 1973 planned program.—Deneye program will be terminated unless priority or funding availability changes. Fuel Air Explosive II (FAE–II) technology will be generated in sufficient detail to permit initiation of Engineering Development of next generation of air-launched Fuel Air Explosive (FAE) weapon.

Program to completion: Deneye undetermined. Fuel Air Explosive (FAEII) ready for release to production in Fiscal Year (FY) [deleted] at present rate of funding.

Resources (In thousands of dollars:)

D.D.T. & E.N. funds for fiscal year 1971, 1,000; fiscal year 1972, 1,010; fiscal year 1973, 515; Additional funds to completion are continuing; and the total estimated cost is not available.

Fuel Air Explosive Weapon II

Chairman Ellender. I note that the entire $515,000 requested for this program is for a project entitled "Fuel Air Explosive Weapon II." Please describe the objective of this program and tell us what you will do with the $515,000 you are requesting.

Dr. Frosch. In addition to the information submitted above, I would like to add that fuel air explosive is one of our newest and most successful conventional munitions. It was a rapid development for the SEAsia conflict and has certain delivery restrictions. The FAE II development program is primarily intended to remove these restrictions and to optimize the weaponization of the fuel air explosive technology.

Aegis Surface-to-Air Missile System

Chairman Ellender. The request includes $82,334,000 for the continuation of the development of the Aegis missile system. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 RDT&E DESCRIPTIVE SUMMARY

AEGIS (Eng)

ENGINEERING DEVELOPMENT

Background.—Our Naval forces, in order to remain effective, must be able to take offensive as well as defensive action against coordinated enemy aircraft and anti-ship missile attacks. In the mid 1970's and 1980's, our Naval forces face a substantial threat capable of inflicting serious damage on such high value targets as carrier task forces, amphibious assault forces, military convoys and individual and small groups of ships on detached missions. [Deleted.] The Navy has recognized the need for a follow-on Surface Missile System to augment the present TERRIER, TARTAR, and TALOS systems and for six years worked on defin-

ing specifications for a new system configuration. In December 1969, the Navy awarded an Engineering Development contract for the AEGIS Weapon System, which is a medium range, surface-to-air, all-weather missile system for use against aircraft, air-to-surface and surface-to-surface missiles, and surface targets, that will provide the surface fleet with a capable AAW defense to meet the threats of the 1975–1985 timeframe. Variants of the AEGIS system are candidates for installation in ships of 5,000 tons and larger; specific goals include installation in a new DG Class to be built at a follow ship cost of about $100 million.

Description.—AEGIS is a fast reaction surface missile system with the capability for engaging multiple air and surface targets. This shipboard weapon system will consist of a fire control system using a multifunction phase planar array radar, high powered illuminators, advanced missile guidance, high fire power launchers and fully digitalized and integrated ship control for radar, weapon and command and control. The electronically scanned radar beam will permit rapid response and excellent flexibility. The midcourse command guidance of the missile permits [deleted]. The launching system will be a rapid cycle, combined Anti-Air Warfare Anti-Submarine Warfare (AAW/ASW) launcher capable of launching the STANDARD missile with midcourse guidance capability, the HARPOON surface-to-surface missile, and the Anti-Submarine Rocket (ASROC) ASW weapon. The key feature of the system is its integrated nature. It will also support fleet air control requirements, [deleted]. It will be completely compatible with the Navy tactical data system, NTDS, and with the other elements of the ship's combat system-passive and active electronic warfare, antisubmarine warfare, guns, and threat identification. Through the use of a digitalized data system there will be an improved data flow between shipboard systems leading to a fully integrated, more effective ship weapons system.

Work performed by.—Radio Corporation of America, Moorestown, New Jersey; Corona Laboratory, California; Naval Weapons Laboratory, Dahlgren, Virginia; Naval Ship Missile System Engineering Station, Port Hueneme, California; Applied Physics Laboratory, the Johns Hopkins University, Silver Spring, Maryland; Naval Ship Engineering Center, Prince Georges Plaza, Maryland; Fleet Computer Program Center, Dam Neck, Virginia; Vitro Laboratory, Silver Spring, Maryland; and Bird Associates, Vienna, Virginia.

PROGRAM ACCOMPLISHMENTS AND FUTURE PLANS

Fiscal year 1972 program.—Complete command and launch Critical Design Review (CDR) and AN/SPY–1 radar control computer program Phase I Tests. Submit detailed design data package for conversion of USS NORTON SOUND Test Ship. Release procurement long lead material for NORTON SOUND conversion. Finalize weapon system design and complete fabrication of EDM–1. Conduct initial component and system tests (CAT I). Commence EDM–1 System Tests and computer program testing at Contractor's Land Based Test Site (LBTS) Facility. Conduct tests on AEGIS Command and Launch up link-down link missile Communications Test Set.

Fiscal year 1973 planned program.—Complete EDM–1 Systems Testing at Contractor's LBTS facility. Finalize Configuration Audit Review (CAR). Start NORTON SOUND rip out at Long Beach Naval Shipyard preliminary to AEGIS installation. Install MK 26 GMLS in NORTON SOUND and test. Deliver to NORTON SOUND and start preinstallation inspection. Complete Weapon System Housing MK 20 Mod 0 at shipyard and perform checkout. Start EDM–1 installation in test ship. Conduct land-based flights of STANDARD Missile control test vehicles to check AEGIS missile link communication test set. Conduct studies and analyses on AEGIS small ship system (EDM–3) toward further simplification and optimize the system design as the first half increment of an authentic all-up pre-production prototype (physical and functional equivalent to production design) for fabrication and test at the LBTS. Ultimate installation is in a designated operational combatant ship as a totally integrated combat weapon.

Program to completion.—Complete EDM–1 installation in NORTON SOUND and at-sea testing and evaluation, including SM–1 missile firings. EDM–3, which evolves from ERM–1, will be designed, fabricated, and tested at factory and at-sea, At-sea tests of EDM–3 will include firings of Standard Missile with midcourse guidance modifications.

AEGIS major milestones

Description:	*Current estimate*
1. Award of E.D. contract	Dec. 69
2. Commence fabrication—Engineering Development Model (EDM–1)	Mar. 70
3. Complete fabrication EDM–1	[Deleted]
4. Complete Category I factory tests EDM–1	[Deleted]
5. Complete at-sea evaluation EDM–1	[Deleted]
6. Complete factory tests of EDM–3	[Deleted]
7. Complete contractor evaluation of EDM–3	[Deleted]
8. Complete Navy technical evaluation of EDM–3	[Deleted]

Resources (in thousands of dollars):
R.D.T. & E.N. funds for fiscal year 1971 and prior, $146,557; fiscal year 1972, $99,168; fiscal year 1973, $82,334; additional funds to completion are [deleted]; and the total estimated cost is [deleted].

AEGIS SURFACE-TO-AIR MISSILE SYSTEM

Chairman ELLENDER. On page 288 of the descriptive summary, I note the following statement, "Aegis is a fast reaction surface missile system with the capability of engaging multiple air and surface targets. This shipboard weapons system will consist of a fire control system using a multifunction, phased planar array radar, high powered illuminators, advanced missile guidance, high firepower launchers, and fully digitalized and integrated ship control for radar, weapon, and command and control." Am I to understand that this program does not include the development of a new missile?

Dr. FROSCH. The Aegis program does not call for a new missile as it is presently constituted. The specification does define a new missile, but this has been delayed as not essential to meet most of the threats in the immediate future. Delaying the missile and using the Standard missile 2 was dictated by dollars. Standard missile 2 is an evolution of Standard missile 1 and requires a relatively small development effort.

Senator YOUNG. What existing missile systems will be compatible with the Aegis system?

Dr. FROSCH. The Standard missile 2 is being designed as the workhorse missile. It will be usable with Terrier and Tartar as well as Aegis. To this degree Aegis is compatible with Terrier and Tartar. The Aegis illuminator radars are also compatible with Terrier and Tartar systems but generally one must think of Aegis as the next generation SAM system replacing Terrier and Tartar. It will be capable af launching Harpoon and Asroc.

Chairman ELLENDER. Tell us exactly what you plan to do with the $82.3 million you are requesting for fiscal year 1973.

Dr. FROSCH. Fiscal year 1973 will be the year in which the equipment designed over the last 8 years is crystallized and assembled. In general terms, the engineering development model No. 1 will be assembled in the land-based test site at Moorestown, N.J., and operated to certify suitable performance. The test ship (*Norton Sound*) will be made ready to accept the EDM–1 (at completion of land-base tests). The launcher MK–26 and allied equipment will actually be installed and tested during the year. Standard missile 2 flights will be conducted at White Sands Missile Range to insure satisfactory progress in this area. In terms of dollars, about $50 million will be utilized by the prime contractor for the completion of system fabrication, assembly, and testing at the land-based test site; $32 million will be devoted to support of Government laboratories, modification, and sup-

port of *Norton Sound* and development of special test equipment needed for the at-sea tests the following year.

Senator YOUNG. I note that the current stated total estimated cost for this R. & D. effort is $482.6 million. What was the original estimated cost of this effort?

Dr. FROSCH. The original cost of the program was estimated as $427.6 million. The growth is made of two parts: $42 million, and $13 million is due to a stretchout caused by budget cuts that the Navy was forced to make in fiscal years 1973 and 1974. The $13 million is actually funds that will be spent after completion of the development program. It is a sum to be used to take care of unknown problems that arise in introducing the system to the fleet.

Chairman ELLENDER. When will the Congress have to make a production decision on this system, and when do you expect it to become operational with the fleet?

Dr. FROSCH. The earliest production release date is [deleted]. However, the total program is laid out on a build-a-little, test-a-little, make-a-small-decision basis. Therefore failure to meet a critical date could slide this "decision to release" date out. However, to date this conservative philosophy points to the probability of meeting the [deleted] date if the shipbuilding program develops on schedule. With this schedule ships should become operational by [deleted].

UNDERSEA LONG-RANGE MISSILE SYSTEM

Chairman ELLENDER. The next item is the request of $520.4 million for the undersea long-range missile system, commonly referred to as ULMS. Selected paragraphs of the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

UNDERSEA LONG RANGE MISSILE SYSTEM

ENGINEERING SYSTEMS DEVELOPMENT

Background.—United States relies upon its ability to launch massive nuclear counterstrike as primary deterrent to any nation preempting nuclear attack. Credible counterstrike capability directly depends upon a counterstrike force whose survivability is invariant with any preemptive attack upon it. Submarine based strategic missile is principal element of National nuclear deterrent forces. Continuing survivability of submarine based strategic missile force is of critical importance. ULMS was conceived to make submarine based strategic missile force relatively invulnerable to broad spectrum of potential future threats, establishing a relatively invariant deterrence credibility. Initial inputs for ULMS concept were derived from "STRAT-X Report" of August 1967. Studies and analyses further refined ULMS concept. CNO issued an Advanced Development Objective (No. 15-09X) for ULMS 1 February 1969 with 1-A importance classification. Secretary of Defense, on 23 December 1971 approved Program Budget Decision No. 317 which calls for an accelerated ULMS Program.

Description.—ULMS consists of two major subsystems: primary strategic missile system, and mobile undersea base, i.e., submarine system. ULMS missile and submarine developments will utilize advances in technology and a goal oriented design approach to increase employment flexibility, significantly reduce vulnerability of submarine, enhance survivability of payload delivered, and greatly expand dimensions of U.S. counterstrike force.

Performed by.—Lockheed Missiles and Space Corporation, Sunnyvale, Calif.; Electric Boat Division of General Dynamics Corporation, New London, Conn.; General Electric Company, Schenectady, N.Y.; Massachusetts Institute of Technology/Defense Laboratory, Boston, Mass.; Naval Ship Research and Develop-

ment Center, Washington, D.C.; Naval Underwater Sound Center, Newport, R.I. and numerous other contractors.

Fiscal year 1972 program.—[Deleted.] This effort is necessary to define requirements in order to meet a system IOC of FY 1979.

Fiscal year 1973 planned program.—[Deleted.]

Program to completion.—Completion of the development aspects of program will lead to the ability to deploy a highly survivable sea-based strategic deterrent force.

Resources [1] (In thousands of dollars):

R.D.T. & E.N. funds [2] for fiscal year 1971 and prior, $60,200; fiscal year 1972,[2] $139,837; fiscal year 1973, $520,400; additional to completion are [deleted]; and the total estimate cost is [deleted].

Chairman ELLENDER. I think we have pretty much covered the ULMS program in our earlier discussion. However, there are a couple of items I do want to clarify for the record. How much of the request of $520.4 million is for work on the ULMS I missile?

Dr. FROSCH. $270 million has been specified for development of the ULMS I missile.

Chairman ELLENDER. How much of the total request is for work on the [deleted].

Dr. FROSCH. [Deleted] development costs are $60 million.

Senator YOUNG. How much of this total is for R. & D. work on the ULMS submarine?

Dr. FROSCH. R. & D. work on the ULMS submarine amounts to $84 million; of this, $7.7 million is for development of the shipboard communications system.

Senator YOUNG. That leaves a balance of $106.4 million for work on various subsystems. Could you be more specific with respect to these subsystems?

Dr. FROSCH. The $106.4 million covers development of the strategic weapon system submarine subsystems. These are comprised of the launcher, fire control, navigation, and instrumentation subsystems.

Chairman ELLENDER. With respect to the $35 million pending in the fiscal year 1972 supplemental for the ULMS program, what programs are involved in that request?

Dr. FROSCH. The breakdown of the $35 million request is shown on this tabulation which I will submit for the record.

(The information follows:)

	In millions of dollars
Strategic weapon supporting subsystems	$9.8
Ship design	13.5
Nuclear propulsion	3.2
Sonar and defensive weapon system	3.0
Other ship subsystems and support	5.5
Total	35.0

PACIFIC MISSILE RANGE

Chairman ELLENDER. $66.8 million is requested for the support of the Pacific Missile Range. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

[1] The above total estimates are order of magnitude and have not been refined, with the exception of FY 1973 budget request. Upon completion of total program definition, re-estimates will be developed. These estimates should be completed by the end of FY 1973.

[2] Includes FY 1972 Supplemental Budget Request of $35.0 million.

[3] Does not include the ULMS–II (D–5) Missile. Total additional RDT&E funds of approximately [deleted] billion will be required if a decision is made to proceed with development of the ULMS–II (D–5) missile beginning in FY [deleted].

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: PMR (Pacific Missile Range)

Category: Management and Support

Budget Activity: 3-Missiles and Related Equipment

DESCRIPTION: The PMR is one of six Department of Defense National Ranges and is under management control of the Secretary of the Navy. PMR encompasses the Headquarters, Point Mugu, California; NAS (Naval Air Station), Point Mugu; PMRFAC HAWAREA (Pacific Missile Range Facility, Hawaiian Area); one highly instrumented Range Ship, USNS WHEELING (AGM-8); MILS (Missile Impact Location System) at Kaneohe, Oahu, and Wake and Midway Islands; and an instrumentation site at Johnston Atoll. Other instrumentation sites include San Nicolas, Santa Cruz, and San Miguel of the Channel Island group off the California coast plus sites along the California coast. Five EC-121K aircraft provide airborne instrumentation platforms and communications relay stations to augment shore installations.

The mission of the PMR is to provide range support for DOD and other designated Government agencies for launching, tracking and collecting data in guided missile, satellite and space vehicles research, development, evaluation and training programs and actual operations. Support to U. S. commercial interests and selected foreign governments is provided when DOD has determined such support to be in the national interest. Range support provided includes: metric tracking of test objects, command control and destruct for range safety purposes, range surveillance and area clearance, meteorological services, range scheduling, communications, frequency interference control and analysis, and data reduction for all operations within the cognizance of PMR including all sea-based missile launches in the Pacific.

WORK PERFORMED BY: Pacific Missile Range, Point Mugu, California
Naval Air Station, Point Mugu, California (including OLF San Nicolas Island)
Pacific Missile Range Facility, Hawaiian Area, Barking Sands, Kauai (including mid-Pacific Island Sites)
USNS WHEELING (AGM-8) and PMR Instrumented Aircraft
Shore-based and other island sites off the California coast

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program:: (a) Estimated support will be required for 8,347 test operations requiring 22,851 Range hours and involving the launch of 3,429 live missiles; (b) a major operational support effort for the F-14 Weapon System is scheduled; (c) initial testing of a research and development model of AEGIS, the Advanced Surface Missile Weapon System; (d) commence design of the Over-the-Horizon Instrumentation System; (e) replacement of obsolete APS-20 Radars, Phase I; (f) Initial procurement of the Mid-Air Retrieval System and (g) procurement of software and special displays for Phase I of an Air Combat Maneuvering Test System.

FY 1973 Planned Program: (a) Planned Range support for 8,400 test operations requiring 24,000 Range hours and the launch of 3,450 missiles; (b) major operational support effort for the F-14/PHOENIX Weapon System; (c) Range support for the AEGIS Missile System; (d) Initial procurement of the Over-the-Horizon Instrumentation System; (e) computer programming and real time display procurement for the Air Combat Maneuvering Test System; (f) Phase I installation of the Integrated Target Control System; (g) complete the replacement program for APS-20 Radars; and (h) expansion of the scientific data computer capacity.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	$58,805	$65,220	$66,785	Continuing	NA

PACIFIC MISSILE RANGE

Chairman ELLENDER. The $66.8 million requested for fiscal year 1973 is $1.6 million more than was provided for fiscal year 1972. Why do you need this increase?

Dr. FROSCH. The $1.6 million increase is for the civilian pay raise as approved by Executive Order 11637, December 22, 1971, cost-of-living adjustment for wage board employees, and increased cost of range operation contract support cost.

Chairman ELLENDER. Please provide for the record a tabulation setting out the specific items included in this request for $66.8 million and also provide the same information for fiscal years 1971 and 1972.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

[Dollars in thousands]

	Fiscal year—		
	1971	1972	1973
Operations	56,695	58,920	61,685
Personnel support	37,555	38,260	39,170
Range operational support contractor	13,950	14,910	16,915
Other support expense	5,190	5,750	5,600
Instrumentation	2,110	6,300	5,100
Total	58,805	65,220	66,785

Senator YOUNG. How many civilian employees are paid from the $66.8 million, and what is the total of their compensation and benefits?

Dr. FROSCH. The $66.8 million budget funds 2,733 civil service man-years with compensation and benefits at $39.2 million.

Chairman ELLENDER. During fiscal year 1973, what are the major activities that you expect to be carried out at the Pacific Missile Range?

Dr. FROSCH. I will be glad to provide that information for the record.

(The information follows:)

FY 1973 ACTIVITY AT PACIFIC MISSILE RANGE

GENERAL

The Range is currently full operational. Major current Navy efforts are the operation support F14A/PHOENIX, SPARROW III, SIDEWINDER, HARPOON, CONDOR, Ship Missile Systems (TERRIER, TARTAR, TALOS, and STDMSL), and Fleet Readiness-at-Sea Operational Evaluation (ROPEVAL), Misslex, AAMEX, ASWEX, SSMEX, SAMEX, ECMEX, and AIRASWEX operations projecting 3,450 missile firings.

AIR FORCE PROGRAMS

Support to USAF programs will continue for: (a) MINUTEMAN launches from Vandenberg AFB; (b) The Advanced Ballistic Reentry Systems utilizing ICBM boosters, (c) Scientific satellites, polar and inclined orbit, (d) SOLO SECTION will continue testing at Point Mugu, (e) The F–15 fighter evaluations at Edwards AFB (Air Force Flight Test Center) will require involvement of PMR Sea Test Range facilities in a manner similar to the F14A Navy aircraft tests.

NASA PROGRAMS

PMR support to NASA programs consist of telemetry, communications, and data handling services to orbital vehicles and space probes. Meterological data and emergency aircraft and communications standby for Apollo space missions.

AEC PROGRAMS

Atomic Energy Commission program activity is expected to continue at approximately the same level. These programs include scientific probe launches from Barking Sands, Kauai, Hawaii.

OTHER DOD PROGRAMS

Other DOD agencies such as Advance Research Projects Agency (ARPA) and Defense Nuclear Agency (DNA) will continue activities at approximately the same level over the next year. These programs contribute to weapon/space systems technology.

Senator YOUNG. What other Government agencies use this range?

Dr. FROSCH. Government agencies outside of the Department of Defense that use the range are AEC and NASA.

MISSILE/WEAPONS SYSTEMS TEST AND INSTRUMENTATION

Chairman ELLENDER. Of the total requested for missiles and related equipment, $2 million is for the program entitled "Missiles/weapons systems test and instrumentation." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

MISSILE/WEAPONS SYSTEMS TEST INSTRUMENTATION

MANAGEMENT AND SUPPORT

Description.—This continuing project provides for development of the specialized range and airborne instrumentation required for realistic test and evaluation, production monitoring and fleet readiness evaluation for all air and surface weapon systems deployed by or under development for the Navy. Instrumentation is being developed to improve the quality and quantity of telemetered data, increase the accuracy and range of trajectory measurement and improve the processing, display and analysis of evaluation data. The Blue Ribbon Defense Panel has stressed the need for more realistic operational test and evaluation of weapons systems which require such improved instrumentation.

Work performed by.—Naval Air Test Center, Patuxent River, Md.; Naval Research Laboratory, Washington, D.C.; Naval Weapons Center, China Lake, Calif.; Naval Missile Center, Pt. Mugu, Calif.; Naval Avionics Facility, Indianapolis, Ind.; Pacific Missile Range, Pt. Mugu, Calif.; various contractors.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

[Deleted.]

Fiscal year 1972 program.—A development contract will be awarded for a portion of the [deleted] improvement. A contract will be awarded for a portion of the [deleted].

Fiscal year 1973 planned program.—[Deleted.]

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971. $3,350; fiscal year 1972, $1,525; fiscal year 1973, $2,000; additional funds to completion are continuing; and the total estimated cost is not available.

Chairman ELLENDER. Has the committee been provided with complete information on your objectives for fiscal year 1973 in this program?

Dr. FROSCH. Yes, sir.

Chairman ELLENDER.. Why do you need the increase of $475,000 you are requesting?

Dr. FROSCH. Several pieces of hardware within this effort have matured to the point in development where modest increases of funding are required to continue an orderly program.

MILITARY ASTRONAUTICS AND RELATED EQUIPMENT

Chairman ELLENDER. The total requested for Navy research and development includes [deleted] million for the budget activity entitled "Military astronautics and related equipment." How much was provided for this activity for fiscal years 1971 and 1972?

Dr. FROSCH. $26.078 million was provided in fiscal year 1971, and [deleted] million was provided in fiscal year 1972, sir.

Chairman ELLENDER. Have there been any significant reprograming increases or decreases in this budget activity for fiscal year 1972, and if so, please comment.

Dr. FROSCH. Yes, sir; a reprograming action is pending to transfer $4.5 million emergency funds into program element 63451N (space technology (advanced)).

Chairman ELLENDER. Have there been any emergency fund transfers to this budget activity during fiscal year 1972, and if so, please comment.

Dr. FROSCH. The $4.5 million I just referred to was emergency funding approved by the Secretary of Defense [deleted].

MAPPING, CHARTING, AND GEODESY

Chairman ELLENDER. The request includes $415.000 for the project entitled "Mapping, charting, and geodesy." Just what do you plan to do with this $415,000 during fiscal year 1973?

Dr. FROSCH. The major portion of the funds ($278,000) will be for work in a special project area at the Naval Weapons Laboratory, Dahlgren, Va.; $78,000 is for hardware improvements for the geoceiver, to design a miniceiver and for automation of the permanent tracking stations. The remaining funds are for technical services and salaries.

INTELLIGENCE AND COMMUNICATIONS

Chairman ELLENDER. The request includes $42,091,000 for several intelligence and communications efforts under the category of "Satellite communications" and "Weather service." Has the committee been provided with details on each of these requests?

Dr. FROSCH. Yes; details have been provided to the committee.

ADVANCED SPACE TECHNOLOGY

Chairman ELLENDER. The total for military astronautics and related equipment includes $47,315,000 for several projects under the category "Advanced space technology." Has the committee been provided with the full details on these projects?

Dr. FROSCH. Yes, sir; they have been provided.

SHIPS, SMALL CRAFT, AND RELATED EQUIPMENT

Chairman ELLENDER. The next item to be considered is the budget activity entitled "Ships, small craft, and related equipment," for which you are requesting $430.2 million. How much was provided for this budget activity in fiscal years 1971 and 1972?

Dr. FROSCH. A total of $278.1 million was provided for this budget activity in fiscal year 1971, and the estimate for fiscal year 1972, is $411.2 million.

SUBMARINES—BQS–13 DNA SONAR

Chairman ELLENDER. Of the total requested for "Ships, small craft, and related equipment," $28.1 million is for the program entitled "Submarines—BQS–13 DNA sonar." Please give us a brief, unclassified description of this program.

Dr. FROSCH. The program consists of making state-of-the-art modifications to improve on submarine sonar system for use in the newer classes of submarines. The modifications will provide improvements in passive detection and analysis, active search, displays, and interfacing with other on-board sonar systems and will provide on-line performance monitoring and fault location capability.

Senator YOUNG. What are your objectives for fiscal year 1973 in this program?

Dr. FROSCH. The objectives of the program for fiscal year 1973, are to complete "in-plant" system certification tests and subsystem development sea tests; to proceed into production if approved by the Defense Systems Acquisition Review Council; to complete incentivised tests; and to accept and have delivered the first two DNA preproduction systems.

FLAGSHIP DATA SYSTEM

Chairman ELLENDER. $352,000 is requested for the program entitled "Fleet escort flagship data system." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FLEET ESCORT (MAJOR)

CATEGORY: OPERATIONAL DEVELOPMENT

Description.—The Integrated Flagship Data System (IFDS) provides the Numbered Fleet Commander (1st, 2nd, 6th, 7th) and his staff with current, organized information be utilized in planning and optimizing the allocation of resources, i.e., ships, aircraft, personnel. This is accomplished through an Automatic Data Processing (ADP) system which permits the establishment and continuous maintenance of data bases and the retrieval, correlation and processing of data for display or hard copy output. The IFDS replaces a manual system and through more efficient utilization of personnel permits the accomplishment of previously required but unaccomplished tasks.

Work performed by.—Naval Electronics Laboratory Center (NELC) San Diego has been given the engineering and system development responsibility. Naval Air Systems Command has cognizance of the Numbered Fleet Commanders Intelligence Center (NFC–IC) development. Principal Command and Control contractors include IBM, Planning Research Corporation, and Computer Sciences Corporation all of San Diego. The main NFC–IC contractor is North American Rockwell Corporation of Columbus, Ohio.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS

Fiscal year 1972 program.—Operational evaluation of selected hardware items. Continuation of software debug. Development of additional operational data bases required by Fleet Commander.

Fiscal year 1973 planned program.—Continue data base development to fulfill operational requirements. Commence development of data bases unique to other Fleet Commanders.

Program to completion.—Complete Fleet test and evaluation. Terminate program in fiscal year 1973.

Resources (in thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971 and prior, $1,092; fiscal year 1972, $559; fiscal year 1973, $352; additional funds to completion are 0; and the total estimated cost is not available.

FLAGSHIP DATA SYSTEM

Chairman ELLENDER. According to the descriptive summary, this program is to be terminated in fiscal year 1973. Have you met all of the objectives originally planned for this program?

Dr. FROSCH. Yes, sir; with the exception of message processing system not accomplished due to lack of funding.

Senator YOUNG. What will you be doing with the $352,000 you are requesting for fiscal year 1973?

Dr. FROSCH. The $352,000 for fiscal year 1973, will be used to complete the documentation, conduct operational evaluation, support the system, and complete the data base software.

AN/SQS–26 SONAR IMPROVEMENTS

Chairman ELLENDER. $2.1 million is requested for the program entitled "Surface ASW (Operational Systems)—Sonar SQS–26." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

SURFACE ASW (OP SYS)

CATEGORY: OPERATIONAL SYSTEMS DEVELOPMENT

Description.—Program element supports the AN/SQS–26 Sonar Improvement Project S2202. AN/SQS–26 Surface Ship Sonar provides fleet with equipment which performs ASW functions of submarine detection, classification, localization, and tracking under many environmental conditions at long ranges using direct, bottom-reflected, and convergence zone acoustic paths where occurring in oceans [deleted]. Program dedicated to improvement in reliability, maintainability, human engineering [deleted], classification, track, and operability, plus increased system performance [deleted]. Competing new concepts being breadboarded, tested and evaluated for potential improvement of the existing AN/SQS–26 Sonars (over 100 in the fleet by mid FY–73).

Work performed by.—Naval Ship Systems Command, Washington, D.C.; Naval Underwater Systems Center, New London, Conn.; General Electric Co., Syracuse, N.Y.; Edo Corp., Long Island, N.Y.; TRACOR, Inc., Austin, Texas; Honeywell, West Covina, Calif.; Sperry Gyroscope, Great Neck, N.Y.; Singer-Librascope, Glendale, Calif.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—Development effort on movements continuing with test and evaluation being initiated on new breadboarded concepts and continuing on [deleted]. Operational Appraisal, Project p/S–5, completes at sea operation [deleted] Third Quarter. Data analysis and reporting for at sea tests [deleted] continue [deleted] investigation and evaluation will complete. Command Level Doctrine for sonar to be promulgated.

Fiscal year 1973 planned program.—Breadboard development effort on improvements completes with test and evaluation continuing. Data analysis and reporting [deleted] to complete. [Deleted] measurements to continue. Operating Doctrine effort to complete. Decrease in funding FY 1972 to FY 1973 result of completion of breadboard hardware development early FY 1973 and planned completion of [deleted] tests FY 1972.

Program to completion.—Engineering Development, construction, test and evaluation of backfit improvement kits.

Resources (in thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, 3,500; fiscal year 1972, 4,139; fiscal year 1973, 2,065; additional funds to completion are continuing; and the total estimated cost is not available.

AN/SQS–26 Sonar Improvements

Chairman Ellender. Can you give us a short, unclassified description of this program?

Dr. Frosch. I will be glad to do so. The AN/SQS–26 sonar improvements program is dedicated to improvement in relability, maintainability, human engineering, classification, track, operability, and performance. Competing new concepts are being breadboarded, tested, and evaluated for potential improvement of the existing AN/SQS–26 sonars.

Senator Young. I note that your request for fiscal year 1973, is approximately $2.1 million less than was provided for fiscal year 1972. Would you comment on the reasons for this decrease.

Dr. Frosch. The greater funding in fiscal year 1972, was necessary in order to develop the breadboard improvements. Development of these breadboards completes in early fiscal year 1973. Therefore, the primary effort in fiscal year 1973, will be test and evaluation of these breadboards, not development, thus, less funds are necessary.

Submarine Silencing

Chairman Ellender. The request includes [deleted] for the submarine silencing program. Has the committee been furnished with full information on this program?

Dr. Frosch. Yes; it has.

All-Weather Carrier Landing System

Chairman Ellender. $1.2 million is requested for the program entitled "Tactical Command and Control (Operational Systems): All-Weather Carrier Landing System." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

Tactical Command/Control (Operational System)

CATEGORY: OPERATIONAL DEVELOPMENT

Description.—All-Weather (Automatic) Carrier Landing System (ACLS) will provide carrier aircraft with safe, reliable final approach and landing system that will operate in conditions of severe weather and sea state. The landing system has three modes of operation; fully automatic (Mode I), semi-automatic with pilot controlling aircraft (Mode II), and manual talk-down (Mode III). Modes I and II of the system interface with the Naval Tactical Data System (NTDS). [Deleted.] Shipboard precision tracking radars feed aircraft position data to digital computer that generates control commands for transmission on Link-4A to suitably equipped aircraft for landing. Shipboard system is dualized to maintain 1 minute interval between landing aircraft. No limitation on use of system due to reduced surface ceilings or visibility provided carrier/aircraft are equipped with independent pilot monitor (SPN–41/ARA–63).

Work performed by.—Test and evaluation conducted by the Naval Air Test Center, Patuxent River, Maryland; Naval Electronics Test and Evaluation Facility, Saint Inigoes, Maryland. Prime contractors: Bell Aero Systems Company, Buffalo, New York, for shipboard system; Radiation Incorporated of Melbourne; and Airborne Instruments Laboratory of Long Island, New York, for airborne systems.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1972 program.—System demonstrated capability to land F–4 aircraft with deck pitching 3–5 degrees, ramp moving over 30 feet. Aircraft control difficulties experienced in turbulence both in approach path and landing areas.

Fleet reported shifting of mean touchdown point forward as natural wind component of wind over deck decreases [deleted]. Improvement in controlling aircraft in turbulence can be achieved by improving wind sensors and use of adaptive computer program techniques. Funds requested fiscal year 1972 are to develop and test suitable control program for improving touchdown dispersion and reducing bolter rate.

Fiscal year 1973 planned program.—Funds fiscal year 1973 are to develop and test wind sensor for remote measurement of air wake turbulence to improve aircraft control in turbulence.

Program to completion.—Requires development of control programs for other aircraft types and development of adaptive control program techniques to adjust automatically for variations in aircraft configuration equipment failure or degradation.

Resources (in thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, $600; fiscal year 1972, $675; fiscal year 1973, $1,190; additional funds to completion are continuing; and the total estimated cost is not available.

Chairman ELLENDER. What do you plan to do with the funds you are requesting for fiscal year 1973?

Dr. FROSCH. We plan to test modifications to the SPN–41 stabilization (SPN–41 is the independent pilot monitor) to achieve compatibility with the SPN–42 automatic landing system in deck motion. We also need to improve the flexibility of installation of the SPN–41 on carriers to minimize interference from parked aircraft. These two problems impact directly on ship installations and are more urgent than the development of a remote wind sensor as originally planned in fiscal year 1973. The wind sensor development is being delayed until fiscal year 1974.

Senator YOUNG. Why do you need the rather large increase of some $515,000 you are requesting?

Dr. FROSCH. The increase in fiscal year 1973 is to design, develop, and install a prototype modification to the SPN–41 stabilization system on a carrier. The remaining funds will be used to test the modification at sea.

TACTICAL INTELLIGENCE AND PROCESSING SUPPORT

Chairman ELLENDER. [Deleted] is requested for the program entitled "Tactical intelligence and processing support—shipboard." Can you give us a brief, unclassified description of this program?

Dr. FROSCH. I will be happy to. This program provides development, test, and evaluation in support of the naval intelligence processing system (NIPS). Specifically, efforts are being undertaken to update the capabilities of the integrated operational intelligence centers (IOIC's) aboard aircraft carriers to support aviation strike planning, and to improve the capabilities for handling intelligence information aboard amphibious assault ships in support of assault planning and coordination.

Chairman ELLENDER. I note that for fiscal years 1971 and 1972, you show zero man-years involved in this program, and for fiscal year 1973, you show 14. Since this program has been funded for all 3 years, can you explain this apparent inconsistency?

Dr. FROSCH. Yes, sir; the man-year figures shown include only those civilian man-years expended at inhouse Navy R.D.T. & E. activities. Most of the fiscal year 1971 and 1972 was contracted to industry, while the fiscal year 1973 work includes test and evaluation at an inhouse

Navy field activity with 14 civilian man-years expended at that activity on this program.

Senator YOUNG. Just what is the need for the [deleted] you are requesting for fiscal year 1973?

Dr. FROSCH. This money is required to continue advanced data base development for adequate interface with antisubmarine warfare data systems, ocean surveillance systems and other command support systems. Hardware and software developments will continue for new sensors and data to support shipboard planning centers.

CRYPTOLOGIC ACTIVITIES

Chairman ELLENDER. The request includes [deleted] for various projects under the cryptologic activities program. Is this a part of the consolidated cryptologic program of the Department of Defense?

Dr. FROSCH. Yes, sir.

SPECIAL COLLECTION ACTIVITIES

Chairman ELLENDER. Has the committee been provided with the details of the request of $1.5 million for special collection activities?

Dr. FROSCH. Yes, sir; they have.

SCIENTIFIC AND TECHNICAL INTELLIGENCE

Chairman ELLENDER. [Deleted] is requested for the program entitled "Scientific and technical intelligence". Can you give us a brief, unclassified description of this program?

Dr. FROSCH. I wil be happy to do so. This is the foreign material exploitation program to provide the fleet and the research and development community with accurate technical data on the characteristics and vulnerability of foreign equipment which poses a threat to the U.S. Navy. A program is necessary for development and testing of countermeasures to insure effective retaliation against these threats.

COMMUNICATIONS SECURITY

Chairman ELLENDER. [Deleted] is requested for the program entitled "Communications security." Has the committee been furnished with complete details on this program?

Dr. FROSCH. Yes, sir.

SPECIAL ACTIVITIES

Chairman ELLENDER. The next item is a substantial request for a classified program designated "Special Activities." Has the committee been provided with details of this request?

Dr. FROSCH. Yes, sir; they have.

ADVANCED COMMUNICATIONS

Chairman ELLENDER. $3.4 million is requested for the program entitled "Advanced Communications." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

Advanced Communications

CATEGORY: 3-ADVANCED DEVELOPMENT

Description.—This element consist of three communication and three air control projects. These projects are:

U3292—Anti-Compromise Emergency Destruction. The objective of this project is to develop a capability for selected ships, aircraft, and shore activities to destroy classified information [deleted].

X3278—Integrated Shipboard Communications (ISC). Advanced Development of integrated shipboard communications system that is capable of processing greater volumes of voice, data and record traffic with lower error rates, easier to maintain with fewer personnel to operate and be of modular design to permit tailoring to various classes of combatant ships. [Deleted.]

S3273—Advanced Interior Communications System (AICS). Objective of project is to develop advanced interior communication systems for new construction ships. A basic distribution system with a family of equipment modules and terminal equipments will be developed based on a system concept which integrates present multiplicity of independent voice communications systems (sound powered telephones, ship service telephones, intercommunications) into one common system.

W3425—Integrated Tactical Air Control System (ITACS). This project is an integrated communications, navigation, Identification Friend or Foe (IFF), air control and collision avoidance system which will satisfy requirements for *all* Navy and Marine Corps aircraft in the 1980 to 1990 era. [Deleted.]

X3426—Marine Remote Area Approach and Landing System (MRAALS). [Deleted.] This system should be compatible with existing approach aids available at forward air bases and carriers to enable V/STOL aircraft to utilize the same guidance system at both terminals of the flights.

W3427—National Microwave Landing System (NMLS). The development program is a nationwide systems engineering approach to advance the aircraft landing technique from the current Ground Controlled Intercept (GCA) and Very High Frequency/Ultra High Frequency (VHF/UHF) Instrument Landing System (ILS) capability. Hardware implementation of the concept will be modular in nature permitting the user to select the level of capability required for the specific task. In its most sophisticated form, the concept will facilitate automatic control of aircraft through curved approaches to landing in zero-zero weather conditions. Validation of the concept to meet Navy needs will be accomplished with hardware delivered in early fiscal year 1975.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Work performed by.—Naval Electronics Laboratory Center, San Diego, Calif.; Naval Research Laboratory, Washington, D.C.; Naval Weapons Center, China Lake, Calif.; Texas Instruments, Inc., Dallas, Tex.; Naval Air Test Center, Patuxent River, Md.; RCA, Camden, N.J.

Fiscal year 1972 program.—U3292—Anti-Compromise Emergency Destruction. Complete identification of requirements for automated test equipment of emergency destruct systems. Complete identification of requirement for integrated logistic support of emergency destruct systems. Conduct advanced development leading to sufficient definition to permit the establishment of specific operational requirements.

X3278—Integrated Shipboard Communications (ISC). Zero funded.

S3273—Advanced Interior Communications System (AICS). No funds allocated for program.

W3425—Integrated Tactical Air Control System (ITACS). Work to be accomplished under exploratory development funding. ITACS subsystem components will be integrated into basic subsystems and flight-tested to verify feasibility of approaches. Feasibility of the Tactical Navigation Communications (TACNAV COM) system for tactical aircraft navigation will be demonstrated in flight test program. Results will be useful in developing ITACS system.

X3426—Marine Remote Area Approach and Landing System (MRAALS). Program initiated: It is intended to award competitive Research and Development contracts.

W3427—National Microwave Landing System (NMLS). Initiate system development under Department of Transportation (DOT) sponsorship with supporting Department of Defense (DOD) and National Aeronautical Space Administration (NASA) Exploratory Development.

Fiscal year 1793 planned program.—U3292—Anti-Compromise Emergency Destruction. Involves completion of development.

X3278—ISC. Develop Message Processing Subsystem (MPS) and Monitor and Control Subsystem (MCS) test plans. Develop Integrated Logistic Plans for MCS and MPS. Develop ISC test plans. Perform systems engineering for ISC, MCS and MPS. Start development of MCS and MPS hardware. Design and build test bed for ISC, MCS, and MPS.

S3273—Advanced Interior Communications System (AICS). Effort will be directed towards expanding the applicability of the AICS concept to other ship types and defining a detailed development approach. This effort will form the basis for recommendations regarding the improvement of the total interior communications systems aboard large ships. Tasks include: A complete and comprehensive analysis of the Interior Communications (IC) requirements for selected ship types. Data collected during the Fiscal Year 1971 effort will form basis for analysis. A definition and trade-off analysis of alternate AICS configurations. This will include a comparative analysis of other advanced IC system concepts. A selection of a configuration and establishment of specific system characteristics. A detailed system design and performance specification.

W3425—Integrated Tactical Air Control System (ITACS). Flyable brassboard model of some ITACS subsystems will be fabricated by end of fiscal year 1973. Preliminary design, fabrication, and test of experimental universal modem will be completed. Design and development of advanced development model of ITACS system will be initiated. [Deleted.]

X3426—Marine Remote Area Approach and Landing System (MRAALS). Continuation of hardware development started in FY 72.

W3427—National Microwave Landing System (NMLS). Initiate development test plans, establish liaison with system developers to discuss system/aircraft interfaces and identify instrumentation needs.

Program to completion.—Program element consists of continuing development projects.

Resources (In thousands of dollars.)

R.D.T. & E.N. funds for fiscal year 1971, $1,418; fiscal year 1972, $1,005; fiscal year 1973, $3.407; additional funds to completion are continuing; and the total estimated cost is not available.

ADVANCED COMMUNICATIONS

Chairman ELLENDER. Please provide a tabulation listing the projects funded under this program, the amounts for each for fiscal years 1971 and 1972, and the estimate for fiscal year 1973.

Dr. FROSCH. Yes, sir; I will be glad to.

(The information follows:)

ADVANCED COMMUNICATIONS

Project number and title	Fiscal year— 1971	1972	1973
S3273 Advanced IC communications	385	----------	300
X3278 Integrated shipboard communications	783	----------	1,220
U3292 Anti-compromise destruct system	250	500	700
W3425 Integrated air control system	----------	----------	827
X3426 MRAALS	----------	505	260
W3427 Nat Microwave Ldg Systems	----------	----------	100
Total	1,418	1,005	3,407

Senator YOUNG. How is the work on these projects allocated between Navy inhouse and industrial organizations?

Dr. FROSCH. All of the work in the national microwave landing system is Navy inhouse at the Naval Air Station Patuxent River. In the integrated tactical air control system 50 percent of the work is Navy inhouse with the remainder spread among various commercial contractors.

Chairman ELLENDER. Are you requesting funds for fiscal year 1973 for any projects which have not been funded in prior fiscal years? If so, would you describe them for us?

Dr. FROSCH. Yes, we are starting integrated tactical air control system (ITACS) for $827,000 and the national microwave landing system for $100,000. The ITACS is an integrated communications, navigation, and identification (CNI) system which will satisfy requirements for all Navy and Marine aircraft in the 1980 to 1990 era.

The microwave landing system is a triservice effort to participate in the Department of Transportation development of a common civil/military landing system which will facilitate automatic control of aircraft in approaches to landing in all weather conditions.

Chairman ELLENDER. I note that one of the projects for which you are requesting funds is entitled "Anti-compromise Destruction System." Was this project initiated as a result of our experience with the *Pueblo?*

Dr. FROSCH. Yes, sir; this project is to develop a capability for selected ships, aircraft, and shore activities to destroy classified information within 30 minutes from the time the decision is made to destroy such information.

Chairman ELLENDER. I note that two of the projects for which you are requesting funds—"Advanced interior communications system" and "Integrated shipboard communications"—were funded in fiscal year 1971 but were not funded in fiscal year 1972. You are requesting funds for both of them in fiscal year 1973. Please comment on this.

Dr. FROSCH. Mr. Chairman, these projects were not funded in fiscal year 1972 because of other projects which had a higher priority.

Senator YOUNG. Please comment on the need for the increase of $2.4 million you are requesting for advanced communications.

Dr. FROSCH. In fiscal year 1972 only two of the six projects in this element were funded. The reason for the increase of $2.4 million is that all six projects are funded in fiscal year 1973.

Chairman ELLENDER. Please comment on the project entitled "Marine Remote Area Approach and Landing Systems" and tell us what you will do with the $260,000 you are requesting for fiscal year 1973.

Dr. FROSCH. The Marine Corps Remote Area Approach and Landing System (MRAALS) will provide helicopters and V/STOL aircraft a capability of locating and making an approach to touchdown at remote landing zones under all weather conditions. This lightweight (transferable by two men) terminal landing system will give the pilot information about the position of his aircraft relative to glideslope, centerline and slant range distance to the touchdown point during his approach. The $260,000 for fiscal 1973 is required to procure two service test models (STM) of both the ground and airborne subsystem through competitive parallel development contracts with production options.

AMPHIBIOUS ASSAULT CRAFT

Chairman ELLENDER. The next item is a request of $8,251,000 for the amphibious assault craft program. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Surface Platforms (Advanced)

Category: Advanced Development

Budget Activity: 5-Ships, Small Craft and Related Equipment

BACKGROUND: Project established to develop an Amphibious Assault Landing Craft System which will provide a substantial improvement in the effectiveness of the Ship-to-Shore movement of personnel and material. Particular emphasis is on providing the capability to launch amphibious assault operations from the fleet while dispersed and at considerable distance from the beachhead. These 35 to 50 knot craft will replace ten knot craft of World War II vintage to carry heavy loads at high speeds and deposit the landing forces safely on dry land beyond the surf zone to increase their effectiveness. The craft could also provide the capability for rapid retraction or relocation forces and can perform a variety of other missions.

DESCRIPTION: The project includes development of an Air Cushion Vehicle Landing Craft about 100 feet long and 50 feet wide carrying a 60-ton payload at 50 knots. It will be fully amphibious to operate from the dry wells of well deck ships on to the hard beach area. Project includes studies of modifications to the craft which might suit other military functions. Work on other types of high speed planing hull boats for use in amphibious operations is underway at low levels so that they can be developed after the large landing craft described above.

WORK PERFORMED BY: Stanford Research Insitute; Naval Ship Research and Development Center; San Francisco Naval Shipyard; Naval Personnel Research and Development Laboratory; Naval Electronics Laboratory Center; Naval Civil Engineering Laboratory; Naval Weapons Laboratory, Dahlgren, Virginia; Gibbs and Cox; Bell Aerosystems; and Aerojet General.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM:

FY 1972 Program: Analysis shows that development of the 120,000 pound payload, 50-knot Air Cushion Vehicle (ACV) will make the most significant improvement in our capability. Design and procurement of test craft from Bell Aerosystems and Aerojet General began on 1 March 1971. Further analysis of the remaining craft will determine selection of next craft to be developed. Analyze designs and model tests of other craft from various subcontractors. Design, build, and test selected cargo handling equipment concepts to assure feasibility.

FY 1973 Planned Program: Continue procurement of long-lead-time components, construction, and test of 120,000 pound payload, 50-knot ACV's. Continue development of advanced cargo handling equipment. Continue operations analysis and simulation studies for detailed design guidance. Begin preparation of draft Engineering Development and Acquisition Plan.

Program to Completion: Construct and test complementary craft. Install craft and cargo handling equipment in selected landing ships. Perform full-scale trials of craft and cargo handling equipment. Perform operations analysis and simulation

studies using full-scale test and trials data to validate craft selection and performance. Establish criteria and provide documentation for start of optimization Engineering Development and Acquisition for Fleet use in the 1975 time frame.

Major Milestones for the program are:

March 1971	-	Procure test craft from two contractors
September 1973	-	Roll out test craft by Aerojet General
October 1973	-	Roll out test craft by Bell Aero Systems
December 1973	-	Complete builders test and trials program
August 1974	-	Complete craft performance tests and trials
August 1975	-	Complete all performance documentation on program

RESOURCES: ($ in Thousands)	FY 1971 & Prior	FY 1972	FY 1973	Additional to Completion	Total Est Cost
RDT&EN Funds	6,022	4854	8251	40,695	59822

AMPHIBIOUS ASSAULT CRAFT

Chairman ELLENDER. What is the objective of this program?

Dr. FROSCH. The objective of this program is to develop an air cushion vehicle landing craft (AALC) designed to carry 60 tons of men and equipment from ships "over the horizon" to dry land at 50 knots in sea state 2.

Senator YOUNG. What is the current status of the development of this vehicle?

Dr. FROSCH. Contracts have been awarded to the Bell Aerospace Co. and Aerojet General Corp. for the development of full-scale testcraft. The craft will be delivered to the Navy in September 1975.

Chairman ELLENDER. Is this program related to the program of Advanced Research Projects Agency for the use of air cushion vehicles in the Arctic?

Dr. FROSCH. There is no direct relationship between this program and the Advanced Research Projects Agency (ARPA) Arctic SEV project. The basic technology is similar; however, the ARPA requirement to develop craft systems suitable for operation in extreme cold, over rough ice and tundra and other environmentally unique factors represent development problems quite different from those being pursued in our Navy efforts. Technical information is closely coordinated between these projects to prevent any duplication of effort.

Senator YOUNG. Tell us exactly what you plan to do with the $8.3 million you are requesting for fiscal year 1973.

Dr. FROSCH. The fiscal year 1973 funds will be used primarily to fund the test craft contracts. A total of $6.9 million will be used for this purpose. The remaining $1.4 million provides for Navy direction, systems analysis and technical support, particularly in the area of vehicle interfaces with amphibious force ships.

Chairman ELLENDER. Does this program involve the development of a craft that you plan to procure or for the development of a technology?

Dr. FROSCH. The results of evaluation of the two testcraft configurations will lead to an amphibious assault craft design which we plan to procure.

HYDROFOIL CRAFT

Chairman ELLENDER. The request includes $8,567,000 for the continuation of the hydrofoil craft development program. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

SURFACE PLATFORMS (ADVANCED)

CATEGORY: ADVANCED DEVELOPMENT

BUDGET ACTIVITY: 5 SHIPS, SMALL CRAFT ,AND RELATED EQUIPMENT

Background.—Since 1960, the U.S. Navy has been developing hydrofoil technology. This technology is represented by four hydrofoils. The 120 ton PCH–1 (HIGHPOINT) was built ten years ago and is now being modified to reflect modern technology. The 320 ton AGEH–1 (PLAINVIEW) is the largest hydrofoil in the world and is undergoing a systematic series of tests to provide baseline data on large foil systems. There are also two smaller hydrofoils (PGH–1 and PGH–2) operating with the fleet. The acquisition of the Hydrofoil Patrol Ship System (PHM) is now underway in concert with other NATO nations.

Description.—This project provides for tests and trials of present hydrofoils combined with development of larger scale subsystems and components in order to provide technology to support the construction and demonstration of a large hydrofoil (DBH) of moderate speed and also a fast hydrofoil (PFH) capable of speeds of about [deleted] knots. Trials of these test ships will provide the technology base for optimization and acquisition of future hydrofoils.

Work performed by.—Naval Ship Research and Development Center, Naval Ship Engineering Center, Puget Sound Naval Shipyard and contractors such as Boeing, Grumman and others.

Program accomplishments and future programs:

Fiscal year 1972 program.—The modification of PCH–1 is underway. This will be followed by tests and trials to confirm its improved performance envelope. Smooth and rough water trials of AGEH–1 will be continued. Other development efforts will focus on the design of a large experimental hydrofoil (DBH). This ship will be about 750 tons with a design speed of about 50 knots. The ship will be optimized for long endurance. The ship configuration concepts, life cycle, and comparative studies are being undertaken simultaneously. Preliminary studies on a fast experimental hydrofoil (DFH) of about 250 tons and a design speed of about [deleted] knots have been started. These efforts will be supported by subsystem studies, and component development. Strut/Foil/Propulsion concepts as well as research on high speed foils and foil controls will be conducted in parallel with efforts on hydromechanic, hydroelastic, and structural problems.

Fiscal year 1973 planned program.—Conceptual work on the DBH is expected to coalesce. Data from the modified PGH–1 will be available and long lead-time hardware for DBH will be procured. Construction contracts will be drafted and all study results will be synthesized into an RFP to acquire DBH. Tests on FRESH–1 using the demonstration foils and transit foils will be conducted. A third set of foils wil be developed to extend supercavitating foils and strut technology. Mission equipment, tests and demonstrations on PCH and AGEH will be conducted to provide inputs to DBH and DFH. Operations of PGH–1 and PGH–2 as well as progress on PHM acquisition will be monitored to provide inputs to R&D planning. The major focus will be to arrive at a position to commence acquisition of DBH early in FY 1974.

Program to completion.—PCH, AGEH, and FRESH–1 will be used as test platforms for platform and payload development. DBH and DFH will be defined, developed, and tested. Data from operations of PGH–1, PGH–2, and PHM will be accumulated. The development also includes studies, and modifications of sensors and weapons on hydrofoils. The result will be a firm technology base for future acquisition of hydrofoils beyond current capabilities.

Major milestones to obtain greater capability are as follows:

January 1972—Approve revised Technical Development Plan.

September 1972—Complete modification of PCH–1.

March 1973—Complete tests of modified PCH–1.

July 1973—Begin construction of Large Hydrofoil Ship (DBH).

August 1974—Begin construction of Fast Hydrofoil Ship (DFH).

July 1975—Complete construction of Large Hydrofoil Ship and begin test program.

August 1976—Complete construction of Fast Hydrofoil Ship and begin test program.

December 1976—Complete testing of Large Hydrofoil Ship.

March 1977—Complete testing of Fast Hydrofoil Ship.

June 1977—Complete program.

Resources (in thousands of dollars):

R.D.T. & E.M. funds for fiscal year 1971 and prior, $50,919; fiscal year 1972, $7353; fiscal year 1973, $8567; additional funds to completion are $116,200; and the total estimated cost is $183,039.

HYDROFOIL CRAFT

Chairman ELLENDER. Briefly, what is the objective of this effort?

Dr. FROSCH. The objective of this program is to demonstrate technology and mission effectiveness of larger and faster hydrofoils.

Chairman ELLENDER. Is this R. & D. program in any way related to the procurement of the proposed guided missile hydrofoil patrol boats for which funds are requested in the shipbuilding and conversion appropriation?

Dr. FROSCH. The technology being used in the guided missile hydrofoil patrol boats (PHM) is a direct spin-off from this R. & D. program. There is no direct link between the two projects although the R. & D. project is supplying data on the latest advances in hydrofoil state of the art to the PHM program. The PHM represents the state of the art for procuring hydrofoils now. The R. & D. program is developing the technology to proceed to the next generation of larger and faster hydrofoils.

Senator YOUNG. Tell us exactly what you plan to do with the $8.6 million you are requesting for fiscal year 1973.

Dr. FROSCH. I believe it would be best to list this for the record.

(The information follows:)

Item	*Amount (dollars in millions)*
Technology efforts including improved hull forms, fabrication of materials for larger and faster hydrofoils, improved propellers and hydraulic systems	3.3
Trials and modernization of PCH–1 and new larger hydrofoil (DBH)	2.7
Total	8.6

ADVANCED SHIP DEVELOPMENT

Chairman ELLENDER. The request includes $12,615,000 for the program entitled "Advanced Ship Development." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Surface Platforms (Advanced)

Category: Advanced Development

Budget Activity : 5-Ships, Small Craft and Related Equipment

BACKGROUND: Project established to support conceptual phase of new ship development which must procede actual ship design.

DESCRIPTION: Objective is to support the ship conceptual design efforts of new ship systems generated in response of new military requirements. Work includes examination of new concepts, exploration of alternative designs, description of operational characteristics, trading-off of alternative subsystems, and design evaluation by cost and effectiveness values. In addition to supporting the conceptual design of new ships, the project supports development of general design procedures and the development of Navy in-house capabilities in personnel, analytical techniques, data banks and computer software. Actual ship design work commences upon completion of the conceptual work performed in this project.

WORK PERFORMED BY: Naval Ship Systems Command, Naval Ship Engineering Center, Naval Ordnance Systems Command, Naval Facilities Engineering Command, Naval Supply Systems Command, Bureau of Naval Personnel, Bureau of Medicine and Surgery, Naval Ship Research and Development Center, Naval Electronics Laboratory Center, selected Naval Shipyards, Contractors: General Dynamics (EB): Consultec; Wheeler Industries; Bolt, Baranek and Newman; Applied Physics Laboratory/University of Washington; M. Rosenblatt & Son and others.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program:

SSN - The Conceptual effort for the AHPNAS attack submarine has moved into preliminary design by direction of CNO. Other supporting mid-70's SSN conceptual studies are continuing. A System Certification and Integration Facility for the central computer complex has been established.

SCS - A plan for the Conceptual Phase for the Sea Control Ship (SCS) was completed; conceptual efforts for remote sensor studies and new aircraft maintenance concepts will continue.

PF - The Conceptual design phase of the PF will complete in August 1972.

PHM - Conceptual studies and preparation of Circular of Requirements was initiated for the Patrol Hydrofoil Missile ship (PHM).

CVS - A new conceptual effort was initiated to design a multi-hull small CVS.

A new conceptual effort was initiated to design a 3500 ton catamaran,

Development of a top level system specification was initiated. Efforts continued in development of effectiveness models and ship design criteria.

FY 1973 Planned Program: The Conceptual phase effort for the SSN and SCS will continue at a high level in FY 73. Continued development of conceptual phase resources, procedures, techniques and data banks for ship design criteria will be continued. Refinement of "point designs" developed in FY 72 will be pursued to permit direction of related technological development efforts. One or two additional conceptual phase efforts may start. Resource build-up will continue with emphasis on refinement of the Top Level System Specification.

Program to Completion: This has been planned as a 20-year program, beginning in 1965, with the conceptual phase being applied to about four designs per year. Continuing support will be required for the development of advanced ship concepts, in-house resources of personnel, techniques, and data banks.

RESOURCES: ($ in Thousands)

	FY 1971 & Prior	FY 1972	FY 1973	Additional to Completion*	Total Estimated Cost*
RDT&EN Funds	33,632	18,756	12,615	55,264	120,267

*Program projected through FY 1977.

ADVANCED SHIP DEVELOPMENT

Senator YOUNG. What is the objective of this program?

Dr. FROSCH. The objective of this program is to provide ship conceptual design efforts in support of military requirements for new ships for the fleet. The effort here would carry the design to the point where the new ship is defined exactly enough for shipbuilders to bid for construction of it.

Chairman ELLENDER. I note on page 368 that you had $18.8 million available for this program for fiscal year 1972. I wish you would provide for the record a tabulation listing the various types of advanced ships that were active under this program during fiscal year 1972 and the amounts for each.

Dr. FROSCH. I will be happy to.

(The information follows:)

[Fiscal year 1972 (dollars in millions)]

Item:	
Submarine (SSN)	$4.481
Sea control ship (SCS)	1.700
Patrol frigate (PF)	11.497
Missile hydrofoil patrol boat (PHM)	.237
New concepts (low waterplane catamaran)	.344
Project support	.497
Total	18.756

Chairman ELLENDER. Tell us exactly what you plan to do with the $12.6 million you are requesting for fiscal year 1973.

Dr. FROSCH. Yes, sir. I will provide that for the record.

(The information follows:)

[Fiscal year 1973 funds (dollars in millions)]

Item:	
Submarines (SSN)	$3.5
Sea control ship (SCS)	6.0
Patrol frigate (PF)	1.5
Fleet oiler (AO)	.1
Cable laying ship (ARC)	.1
Fleet ocean tug (ATF)	.02
Project support	.29
Advanced ship concepts [1]	1.09
Total	12.60

[1] Includes efforts on low waterplane catamaran ships, missile destroyer (DG), and test and evaluation ship.

SURFACE EFFECT SHIP

Chairman ELLENDER. The next item is the request of $50,112,000 for the continuation of the surface effect ship program. This is the program we devoted considerable time to earlier. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

SURFACE PLATFORMS (ADVANCED)

BUDGET ACTIVITY: 5-SHIPS, SMALL CRAFT AND RELATED EQUIPMENT

CATEGORY: ADVANCED DEVELOPMENT

Background.—Conventional displacement hulls limit ships speed to a 30-knot range because of the extremely rapid increase in power required for a small

increase in speed. Investigations into methods of obtaining surface ship speeds on the order of 50 to 100 knots have identified two technologies that provide sufficient lift to raise the hull clear of the water and significantly reduce the power required to obtain high speeds. The first method is hydrodynamic lift and is represented by the hydrofoil program. The second method is a cushion of air contained beneath and supporting the hull and is the technology being investigated in this program. Investigations indicate that it is feasible to develop multi-thousand ton ships with speeds of 80 to 100 knots. The most efficient method is a solid sidewall which pierces the water surface so that cushion pressure is primarily vented through the rear seal providing some forward thrust. The technologically different fully-skirted craft, utilizing air propulsion, vent the cushion pressure around the entire periphery. This technique permits an amphibious capability. On the other hand, the solid sidewall technology being used in the SES (Surface Effect Ships) program provides better stability in yaw and also provides greater roll stability. The solid sidewall SES appears to be the best approach to long range, multi-thousand ton open ocean ships capable of speeds in excess of 80 knots. Such ships will provide a greater advancement in surface ship capability than any in the last century and hold a potential for revolutionizing naval warfare.

Initially the JSESPO (Joint Surface Effect Ships Program Office) was formed with the Navy and Commerce as co-equal sponsors. Effective 1 July 1971, the SES Program became a totally Navy program.

Description.—Phase I of the program, FY 1967–1972, has been focused upon the design, development, construction and test of two 100 ton testcraft embodying completely different technological approaches. Test of these two craft will prove concept feasibility and provide the technical verification for proceeding to larger size ships.

Phase II, FY 1973–1978, based upon Phase I accomplishments and a major Navy Mission Analysis will be focused on the design, development, construction and test of two 2200 ton SES prototype ships.

Work performed by.—Approximately 23 contractors and 5 Navy in-house facilities have been involved in our 125 technology and subsystem investigation projects. The more important are: Naval Ship Research and Development Center, Carderock, Md., Naval Air Engineering Center, Philadelphia, Pa., Naval Ship Research and Development Laboratory, Annapolis, Md.; Naval Postgraduate School, Monterey, Calif.; Aerojet-General, El Monte, Sacramento, Azusa, Calif.; Bell Aerospace, Buffalo, N.Y.; Booz-Allen Applied Research, Bethesda, Md.; Curtiss-Wright, Passaic, N.J.; ITT Decca Marine, New York, N.Y.; Goodyear Aerospace, Akron, Ohio, Hydronautics, Laurel, Md.; Lockheed Missiles & Space, Sunnyvale, Calif.; Oceanics, Plainview, N.Y.; Pratt & Whitney, W. Palm Beach, Fla.; North American Rockwell (Rocketdyne), Canoga Park, Calif.; Rohr, Chula Vista, Calif.; Southwest Research Inst., San Antonio, Tex.; Sperry Systems, Great Neck, N.Y.; Stevens Inst., Hoboken, N.J.; Hamilton Standard, Windsor Locks, Conn.

The prime contractors for the two 100 ton testcraft and their principal subcontractors are: *Aerojet-General, ElMonte, Calif.* (Tacoma Boatbuilding, Tacoma, Wash., AVCO Lycoming, Stratford, Conn.; Western Gear, Lynwood, Calif.; Sacramento Div. AGC; Joy Manufacturing, Buffalo, N.Y.; Reynolds Aluminum; Goodyear Aerospace; EMR Div. Weston Instruments, Sarasota, Fla); *Bell Aerospace, New Orleans, La.* (Levingston Shipbuilding, Orange, Tex.; Pratt & Whitney, East Hartford, Conn.; Buehler, Indianapolis, Ind.; Philadelphia Gear, King of Prussia, Pa.; Astrospace Laboratories, Huntsville, Ala.; ALCOA, New Orelans, La.; Goodyear Tire and Rubber, Rockmart, Ga.; EMR)

Fiscal year 1972 program.—Continue the technology efforts to provide predictive techniques for design of SES, and provide correlation between test data and theory in verifying the design of the Phase I ships. Complete construction and begin testing of the two 100 ton testcraft. Continue preparation of the government test site at NATC, Patuxent River, for the 100 ton testcraft. This test facility is to be operational in January 1973. "New Initiatives" in FY 1972 will provide for technical definition and crucial technological experiments for the Phase II ships based upon the results of the SESMA Study. Effort on the design and model testing of the long lead time propulsion subsystem for the Phase II ships will include propulsor, gearing, and transmission systems. Since the propulsion system is the pacing item for larger ships, specific design requirements must be clearly identified to permit specific development to be accomplished effectively in FY 1973. Such effort will also have application to other type ships. Additional mission

analysis is continuing and studies on weapon and sensor suites for larger ships are underway.

Major milestones:	Date
Initiate T&E of 100-ton testcraft	Mar. 72
Initiate Tech. def. config. studies for large SES	May 72

Fiscal year 1973 planned program.—This project, previously contained in Program Element 63534N, Surface Effect Ships, has been included in the new program Element 64551N to more closely parallel GOR areas commencing in FY 1973. *Supporting technology efforts will continue.* The two *100 ton testcraft* will continue to be *tested* by the contractors during the first half of the fiscal year, after which they will be refurbished and transferred to the government test facility at Patuxent River, Maryland, when that site is activated in January 1973. Continued testing to expand the operational envelope will be undertaken. Based upon the FY 1973 initial design engineering effort, *a contract will be awarded for the detail design, construction and test of two R&D test ships.* These ships would undergo platform tests during the period October 1976 to October 1977 and would then undergo tests of specific mission weapon and sensor suites. A major Design Engineering Inspection (DEI) will be conducted eight months after contract award to approve the design and progress on the ships. Any deferment of the Advanced Development effort will greatly delay final fleet introduction into the 1980's and negate the advantage that SES would provide against the growing Soviet naval threat.

Major milestones:	Date
Complete initial 100-ton T&E program	Dec. 72
Complete 100-ton test facility (NATC Pax River)	Feb. 73
DSARC approval for construction of 2000 ton prototypes	Mar. 73
Award contract for design and construction of 2000 ton prototypes	Apr. 73

Program to completion.—Continue technology efforts. Continue testing of the two 100 ton testcraft which will also be utilized for any sensor or weapon system environmental testing prior to test on larger ship. Complete the detail design, construction and test of the large ships in the 2200 ton class. Activate test site for the 2200 ton ships. Complete the technological verification of the feasibility of large SES for military applications. Prepare design manuals supported by suitable industrial technological base for the development of SES in all size categories including larger ships for various specific military applications. Initiate the planning of such ships.

Major Milestones:	Date
Design Engineering Inspection (DEI) 2000 ton prototypes	[Deleted]
Pre-Assembly Review (PAR) 200 ton prototypes	[Deleted]
Initiate prototype testing	[Deleted]
Complete Platform T&E 2000 ton prototype	[Deleted]
Initiate mission Evaluation of 2000 ton prototypes	[Deleted]
Complete Data Package for Future Ships	[Deleted]
Mission Capabiilty Proven	[Deleted]

Resources (In thousands of dollars):
R.D.T. & E.N. funds for fiscal year 1971 and prior, $37,448; fiscal year 1972, $25,689; fiscal year 1973, $50,112; additional funds to completion are $371,557; and the total estimate cost is $484,806.

SURFACE EFFECT SHIP

Chairman ELLENDER. Earlier, you referred to some delays in this program resulting from problems with the two 100-ton prototype ships. On page 371, under the heading "Major Milestones," it is indicated that you expected to complete the 100 ton T. & E. program in December 1972. Do you still expect to meet this date, and if not, what is your revised schedule?

Dr. FROSCH. We expect to complete the initial T. & E. program by December 1972. However, we will continue to test the 100-ton testcraft for a period of several years.

Senator YOUNG. It is indicated that you expected approval of the Defense Systems Acquisition Review Commission for construction of the 2,000-ton prototype in March 1973. Do you expect to live up to this schedule?

Dr. FROSCH. Yes, sir, we feel that we will be ready for Defense Systems Acquisition Review Council approval by March 1973.

Chairman ELLENDER. In order that the record will be complete, I wish you would provide a detailed tabulation for the record setting out the various efforts included in the request of $50.1 million requested for fiscal year 1973.

Dr. FROSCH. I will be happy to do that.

(The information follows:)

Surface Effect Ship Tasks in Fiscal Year 1973
($ in Millions)

TECHNOLOGY		
AERO-HYDRO	**Activity**	**Budget**
Sidewalls and Seals Configurations	Contractor to be Determined	.700
Resistance & Appendages	Contractor to be Determined/NSRDC	.450
Turning & Maneuvering	NSRDC	.350
Advanced Lift Sys	NSRDC	.175
Stability Limit Testing	NSRDC	.275
PROPULSION		
Waterjet Development	Contractor to be Determined/NSRDC	.750
Semi Submerged Propeller	NSRDC	.500
Transmissions	Contractor to be Determined	.600
Air Fans	NSRDC	.100
STRUCTURES		
Materials	Contractor to be Determined	.500
Corrosion Protection	NSRDC	.350
Loads Research	NSRDC	1.200
Structural Design Methods	NSRDC	.150
RELATED TECHNOLOGY		
Sensor-Weapon-Ship Compatability	Contractor to be Determined	.500
Collision Avoidance/Navigation	Contractor to be Determined/NSRDC	.300
Auxiliary Equipment	Contractor to be Determined	.200

TECHNOLOGY

	Activity	Budget
Design Guidance Manuals	Contractor to be Determined	.400
MANNED MODELS		
Propulsion/ Habitability	Contractor to be Determined	.400
Drag & Seals	Naval Postgraduate School	.100
Overhaul & Modifications	Contractor to be Determined	.700
SYSTEMS ENGINEERING		
100 TON W/J TESTCRAFT		
Craft Completion & Test Program	Aerojet Corp.	3.200
Design Evaluation	Aerojet Corp.	.500
Spares & Repairs	Aerojet Corp.	.800
100 TON S/C PROP TESTCRAFT		
Craft Completion & Test Program	Bell Aerospace Co.	3.000
Design Evaluation	Bell Aerospace Co.	.300
Spares & Repairs	Bell Aerospace Co.	1.200
TECHNICAL DEFINITION STUDIES		
Conceptual Studies	Contractor to be Determined	8.000
Design & Start Construction of two Large SES	Contractor to be Determined	18.000
TEST OPERATIONS		
Test Site Operations (SES 100)	Naval Air Test Center	1.000
Training & Procedures (SES 100)	Naval Air Test Center	.200
Test Equipment	Naval Air Engineering Center	.300

TECHNOLOGY

	Activity	Budget
SUBSYSTEMS		
Design & Build Gearbox for Larger SES	Contractor to be Determined	2.000
REQUIREMENTS & DESIGN CRITERIA		
Mission Configuration	Contractor to be Determined	.375
Weapon System Integration	NAVORD	.525
Support Requirements	Contractor to be Determined	.510
PROGRAM MANAGEMENT		1.502
Total Program FY73		50.112

COMPUTER AIDED SHIP DESIGN

Chairman ELLENDER. Please comment on the request of $519,000 for the project entitled "Computer Aided Ship Design."

Mr. FROSCH. The $519,000 will be used to complete development of, and verify the benefits to be derived from computer programs used in the ship design and construction process. The major effort will be to complete the computer-aided structural detailing of ships (CAS DOS) program and to verify its usefulness in the ship design process. Several computer programs have already been developed and demonstrated cost savings in actual use. The program effort so far has been to demonstrate the feasibility of enhancing ship design efforts by using computers in the design process. After the feasibility has been demonstarted by use of individual computer programs, an overall system of programs will be developed. This system will cover the entire ship design process and is expected to offer considerable cost savings over the traditional manual design process.

SURFACE PROPULSION

Chairman ELLENDER. $14 million is requested for a program entitled "Advanced Surface Propulsion." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

SURFACE PROPULSION (ADV)

CATEGORY: ADVANCED DEVELOPMENT

BUDGET ACTIVITY: 5-SHIPS, SMALL CRAFT AND RELATED EQUIPMENT

Background.—A recent review of conventional ship propulsion conducted by the National Academy of Sciences for the Navy points out the need for a revitilized gas turbine program.

Description.—There are two projects in this element.

54622, Marine Gas Turbines: This project develops a family of gas turbine engines to meet future non-nuclear power requirements for all Navy craft except submarines. To be developed are 3 dual purpose (generator drive and propulsion) units [deleted] and 3 large propulsion units [deleted] Jet engines with features such as compactness, lightness of weight, reliability and fuel economy presently demonstrated in modern fan-jet aircraft, will be modified and utilized in marine versions. Use of these engines will reduce manning costs by allowing unmanned engine rooms (at least no permanent watch standers. Readouts of essential data can be provided direct to the bridge. Also included are development of suitable clutches, controllable reversible pitch propellers (CRP) and shaft reversing mechanisms. Thorough testing of engines and components will be conducted to ensure super reliability of marine gas turbine propulsion systems developed.

S. *4658, Shipboard Propulsion Machinery:* This project applies superconductor techniques to motors and generators for electric propulsion transmission looking to replace turbine-gear transmissions due to as much as 50% reduction in size and weight. For submarines it offers potentially quieter operation and an increased capability for burst speed operation on batteries. For surface ships this machinery will provide greater freedom in ship arrangements and flexibility in operating configurations. A wide range of applications is foreseen for this type of transmission system: gas turbine destroyers; fast, quiet submarines; large hydrofoils; air cushion vehicles and other advanced ship concepts such as submerged displacement catamaran forms. The objective is to develop the hardware engineering capability required to build ship propulsion systems and to demonstrate feasibility with small size systems. These systems will be designed and configured so they can be installed in designated vessels for experimental trials under opera-

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tional conditions. The development of both AC and DC machinery systems including motors, generators, controls and transmission line will be initiated. An intensive program to develop cryogenic refrigeration machinery suitable for shipboard systems will be pursued. Other areas to be investigated for development include liquid metal current collection, superconductor design and materials application, NAK and helium handling aboard ship, magnetic shielding, leads, busses, and switchgear.

Work Performed by.—S4622 The two prime contractors involved in the large propulsion units are Pratt & Whitney and General Electric (and possibly Rolls-Royce via an American Licensee). In the smaller sized [deleted] several qualified contractors have expressed interest in the development effort. These contractors include but are not limited to G.E., Garrett, Avco Lycoming, Pratt & Whitney, Solar, and Allison.

Piodi

S4658 Naval Ship Research and Development Center, Annapolis Laboratory; Naval Ship Engineering Center; and contractors to be selected.

Program accomplishments and future programs: S4622 The General Electric LM 2500 engine was converted from the aircraft TF39 (engine for C5A) and marinized into a successful marine unit. Tests on MSC "CALLAGHAN" were carried out and engine is still being operated on 1 shaft of this shipt. LM 2500 was selected as the prime mover for the DD963 class with provision made for use of the Pratt & Whitney FT–4 engine in the event of difficulty with the first election. Three clutches have been developed and have passed qualification testing.

Fiscal year 1972 program.—S4622 In FY 72, the [deleted] dual purpose engine development has been initiated. This engine wil be a "second generation" type employing latest state of the art gas turbine developments resulting in an engine weighing less than 1 pound per horsepower and a fuel economy goal comparable with a similarly rated diesel engine. Testing at sea of a [deleted] controllable and reversible pitch propeller will begin. Additional testing of the LM2500 engine ashore and the LM2500 and FT–4 engines at sea in MSC Callaghan.

S4658 Not applicable; new start in FY 1973.

Fiscal year 1973 planned program.—S4622 The [deleted] engine development will continue. Sea testing of the [deleted] CRP propeller will continue. Depending on available suitable production-based aircraft engines, the marinization either of [deleted] engine will be initiated. Development of practical reversing mechanisms will be undertaken and extensive testing of engines and propulsion system components will continue as a "new initiative" to insure super reliability of marine gas turbine propulsion plants.

S4658 Contracts will be let for DC and AC propulsion plants [deleted] size to be determined by choice of test bed vehicle. Contracts will be initiated with a design competition for the design of [deleted] plants and [deleted] models of these plants. Hardware will include superconductor motors and generators, refrigeration equipment, transmission line, prime mover, controls and load device (for land base test). Back-up technology efforts will be initiated on current collection, superconductor design and materials application, NAK and helium handling, magnetic shielding, leads, busses and switchgear. Analysis of cryogenic refrigeration requirements for large propulsion systems will be conducted, requirements defined and development specifications prepared.

Program to completion.—S4622 Development will be completed on all members of the gas turbine family [deleted]. Reversing mechanisms will complete development. Testing of all components of the propulsion system from the gas turbine to the propulsor will be accomplished.

S4658 Contract for cryogenic refrigeration plant for shipboard applications will be let in FY 74. (Development to provide the reliability, size and noise characteristics required for ultimate ship propulsion systems). Contract for development of AC ship service generator using superconducting field coils will be let in FY 74. Laboratory evaluation of the propulsion system models will be completed in FY 76. The model systems will be installed on test bed vehicles in FY 76 and evaluated in FY 77. The cryogenic refrigeration machinery evaluation will be completed in FY 77. Evaluation of ship service generation will be completed in FY 77.

Resources (in thousands of dollars):

R.D.T.&E., N. funds for fiscal year 1971, $3,130; fiscal year 1972, $5,500; fiscal year 1973, $14,000; additional funds to completion continuing; and the total estimated cost is not available.

Chairman ELLENDER. The project entitled "Shipboard Propulsion Machinery" is apparently being funded for the first time in fiscal year

1973, and you are requesting $4 million. Tell us what you will do with this $4 million.

Dr. FROSCH. I will place that information into the record.

(The information follows:)

The project "Shipboard Propulsion Machinery" is being funded for the first time in fiscal year 1973. The objective of the project is to utilize superconducting technology and develop superconducting electric propulsion machinery for surface ships, submarines and advanced ships such as Surface Effect Ships and Hydrofoils. The $4.0 million will be used as follows:

Item	*Amount in millions*
Contracts for superconducting propulsion machinery [deleted]	$3.0
Naval Ship Research and Development Centers, Annapolis (NSRDC/A) investigation of current collection techniques, shielding, magnetic materials, refrigeration requirements and technical support	1.0
Total	4.0

Chairman ELLENDER. Please comment on the project entitled "Gas Turbine Propulsion System" for which you are requesting $10 million.

Dr. FROSCH. This project develops a family of marine gas turbine engines adapted (or marinized) from existing simple cycle aviation gas turbine engines. Also included in the project are other elements of the propulsion system such as clutches and controllable reversible pitch propellers. In fiscal year 1973, we are placing increased emphasis on the reliability and maintainability of marine gas turbines in order to be absolutely certain that existing and future engines will perform and be maintainable in accordance with specifications. The [deleted] engine development contract with AiResearch (Garrett Co.) awarded in fiscal year 1972, will continue. We will test two controllable reversible pitch propellers (CRP) at sea. One on the east coast and one on the west coast. This type of propeller will be installed in the DD 963.

Senator YOUNG. Please comment on the need for the increase of $8.5 million for "Surface Propulsion" which you are requesting for fiscal year 1973.

Dr. FROSCH. A portion of the increase ($4 million) is for the project "Shipboard Propulsion Machinery" which is starting in fiscal year 1973. The remaining $4.5 million will be used to insure the reliability and maintainability of our gas turbine engines. This will be a new effort in fiscal year 1973 and will consist of developing an internal diagnostics system to give prewarning of engine casualties and to continuously monitor engine performance to reduce or prevent unscheduled engine downtime. Also, further accelerated shore-based testing of the LM 2500 engine will continue under a variety of conditions. At-sea testing will be conducted using the GTS *Callaghan* utilizing a destroyer operating profile.

SURFACE ANTI-SUBMARINE WARFARE

Chairman ELLENDER. $21.8 million is requested for the program entitled "Advanced Surface Anti-Submarine Warfare." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

SURFACE ASW (ADVANCED)

Description.—Program element supports Tactical Towed Linear Array Sonar System (TACTLASS) Project S2232, Joint US/United Kingdom (UK) Sonar Project S2242, Joint US/French (FR) [Deleted] (RAP) Sonar Project S2244, Ship Acoustic and Torpedo Countermeasures (C/M) Project S2243, and Ship Integrated Combat Project S2207. TACTLASS designed provide significant [deleted] capability for destroyer type ships engaged in tactical operations at high own ship speeds. TACTLASS will be comprised of [deleted] Joint US/UK Sonnar Project evaluating surface ship [Deleted] in order to validate system ready for Engineering Development (ED) and that [deleted] can be achieved at [deleted] Joint US/FR RAP Sonar Project will permit U.S. to share results obtained by French [deleted] and to be active member [deleted]. A Memorandum of Understanding (MOU) has been drafted and is in final staffing stages. U.S. will participate with French [deleted]. French will provide [deleted]. Ship Acoustic and Torpedo C/M Project designed provide surface ASW ships with [deleted]. Ship Integrated Combat Project provides [deleted].

Work performed by—Naval Ship Research and Development Laboratory, Panama City, Florida; Naval Ship Research and Development Center, Carderock, Maryland; Naval Underwater Systems Center, New London, Conn.; U.S. Naval Ship Engineering Center, Washington, D.C.; U.S. Naval Personnel Research and Development Laboratory, Washington, D.C.; U.S. Naval Research Laboratory, Washington, D.C.; U.S. Naval Ship Systems Command, Washington, D.C.; Naval Undersea Research and Development Center, Pasadena, California; United Kingdom Navy Department, Admiralty Underwater Weapons Establishment, England; French Navy Department, Laboratories de Detection Sous-Marine, Le Brusc, France; Sperry Gyroscope Company, Great Neck, Long Island, N.Y.; Hydrospace Research Corporation, Rockville, Maryland; Presearch, Inc., Silver Spring, Maryland; Dynell Corporation, Melville, Long Island, N.Y.; Chesapeake Instrument Corp., Shadyside, Maryland; IBM, Owego, New York; Honeywell, West Covina, California.

Fiscal year 1972 program:

(*a*) S2232 TACTLASS: Program experimentation obtain critical data [deleted]. Studies and analyses to support system design and integration including mission analysis and definition of performance envelope. Specifications prepared for entering Engineering Development.

(*b*) S2242 Joint US/UK Sonar: Complete procurement of equipment to be assembled for [deleted] test at field calibration station.

(*c*) S2244 Joint US/FR RAP Sonar: New Start. Studies, data and system analysis.

(*d*) S2243 Ship Acoustic and Torpedo C/M: [Deleted.]

(*e*) S2207 Ship Integrated Combat: Conduct sonar tests in support of [deleted].

Fiscal year 1973 planned program:

(*a*) S2232 TACTLASS: Enter Engineering Development for prototype models.

(*b*) S2242 Joint US/UK Sonar: Analysis of data from barge [Deleted] tests will continue and hydroacoustic test analysis and computations will be carried out. Major hardware procurement will continue. Technical planning and initial at-sea check-out will be conducted.

(*c*) S2244 Joint US/FR RAP Sonar: Continue studies, data and system analysis. Commence simulation and hardware design and tests to prove required components.

(*d*) S2243 Ship Acoustic and Torpedo C/M: Continue Engineering Development of Basic System. [Deleted]

(*e*) S2207 Ship Integrated Combat: [Deleted] Participation in [other] programs sponsored by CNO, COMCRUDESLANT and COMDESDEVGRU.

Program to Completion:

(*a*) S2232 TACTLASS: Shore testing program of Engineering Development Models [Deleted]

(*b*) S2242 Joint US/UK Sonar: [Deleted]

(*c*) S2244 Joint US/FR RAP Sonar: [Deleted]

(*d*) S2243 Ship Acoustic and Torpedo C/M: [Deleted]

(*e*) S2207 Ship Integrated Combat: [Deleted]

Resources. (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, 1,500; fiscal year 1972, 9,878; fiscal year 1973, 21,848; additional funds to completion are continuing; and the total estimated cost is not available.

SURFACE ANTISUBMARINE WARFARE

Chairman ELLENDER. Please provide a tabulation listing each of the projects funded under this program, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

[Dollars in thousands]

Project number and name	Fiscal years		
	1971	1972	1973
S2207 Ship integrated combat	0	220	354
S2232 TACTLASS	0	1,802	10,910
S2242 Joint US/UK sonar	1,000	4,004	5,381
S2243 Ship acoustic and torpedo C/M	0	2,852	3,203
S2244 Joint United States/French RAP	0	1,000	2,000
U2707 ASW torpedo C/M resistance	500	0	0

Chairman ELLENDER. Of the total requested for surface ASW, I note that $2 million is requested for the project entitled "Joint United States/French [deleted] sonar." Could you describe this project, give us its current status, and tell us the arrangement for funding this effort.

Dr. FROSCH. I will be glad to do so.

This project will permit the United States to share the results obtained by the French [delted]. A memorandum of understanding (MOU) has just been signed by both countries. The United States will participate with the French [deleted]. [Deleted.] The French will provide the test ship [deleted.] The United States will provide [deleted] will be exchanged in both directions. The Memorandum of Understanding (MOU) spells out each country's contribution to the program and makes each country financially responsible only for its portion of the program. There is no transfer of funds by either country.

Senator YOUNG. Why do you need the increase of $1 million you are requesting for fiscal year 1973?

Dr. FROSCH. Yes, sir. The project was a new start in fiscal year 1972 with studies, data and system analysis taking place. The fiscal year 1972 effort will be continued in fiscal year 1973; however, an increase in funds is necessary in order to commence simulation and hardware design and conduct tests to prove required components.

Chairman ELLENDER. $10.9 million is requested for the project entitle "Towed Linear Array Sonar." Is it possible to give us a brief unclassified description of this program?

Dr. FROSCH. The program is designed to improve the submarine detection capability for destroyer type ships engaged in tactical operations [deleted]. Selection of the best components from other systems, plus other necessary specialized components, will result from pre-engineering development studies on system design and tradeoffs.

Chairman ELLENDER. Please comment on the need for the large increase of $9.1 million you are requesting for this project for fiscal year 1973.

Dr. FROSCH. Upon completion of successful at sea tests of critical system components in early fiscal year 1973, engineering development of preproduction prototypes for reliability testing, environmental testing, and technical/operational evaluation is scheduled. Prototype development will involve extensive subcontracting for major portions of the system, that is, the [deleted]. It is necessary to fund the contract in fiscal year 1973 to a sufficient level to cover the prime contractor's liabilities for subcontracted items.

Senator YOUNG. $5.4 million is requested for the project entitled "Joint United States/United Kingdom Sonar." Please comment on the objectives of this program, give us its current status, and tell us the arrangement for the funding of this effort.

Dr. FROSCH. The United States and United Kingdom have independently pursued a [deleted]. U.S. investigations begun in 1960 under the Office of Naval Research, were expanded by Naval Ship Systems Command in 1965, and terminated at the end of fiscal year 1968 for financial reasons. Following extensive discussions with the United Kingdom, a basic planning memorandum for a cooperative sonar research program was signed in September 1969 by representatives of both Governments to continue development jointly using a United Kingdom trials ship. The program provides [deleted]. The program is planned as a joint United States/United Kingdom effort in order to achieve validation at significant reduction in cost to each country. [Deleted.] Both countries made commitments in fiscal year 1971 to supply [deleted]. Hardware procurement is currently underway for a [deleted]. The basic planning memorandum spells out each country's contribution to the program and makes each country financially responsible for its portion of the program. There is no transfer of funds by either country.

Chairman ELLENDER. $3.2 million is requested for the project entitled "Ship Acoustic and Torpedo Countermeasures." Please tell us the objectives of this project and comment on the need for the increase of $351,000 you are requesting.

Dr. FROSCH. Yes, sir. In conduct of missions anti-submarine warfare (ASW) ships are subject to detection by enemy acoustic sensors and to attack by enemy acoustic homing torpedoes. Recognizing the tremendous value of an acoustic and torpedo countermeasure system capable of countering such threat, advanced development commenced in fiscal year 1965. As a result, engineering development of [deleted] torpedo countermeasure (NIXIE) was completed and installation in ASW ships will commence in fiscal year [deleted]. This project will provide surface ASW ships with effective survivability and evasion capability against enemy acoustic weapons and sensors. [Deleted.] The increase in funding in fiscal year 1973 is necessary in order to fund a full 12-months cost-plus incentive fee contract on the basic acoustic warfare system.

SURFACE ELECTRONIC WARFARE

Chairman ELLENDER. [Deleted] is requested for projects to be funded under the program entitled "Surface electronic warfare (advanced)". Selected paragraphs from descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

SURFACE ELECTRONIC WARFARE (ADVANCED)

Background.—This element contains SHORTSTOP, the major EW development of the surface ship program. The SHORTSTOP program is a modular EW system with advanced features which integrates into the entire command and control structure of the ship. Full description is included in the Project Descriptive Summary. Other projects include the advanced development of a Dual Mode ECM, [deleted]. This device will be developed in such a fashion that it will integrate directly into SHORTSTOP and other command and control oriented EW systems, or stand-alone in specific installations. Radar Cross Section Reduction of surface ships is primarily aimed at determination of ships radar cross section and determination of techniques which are applicable for reduction of this signature. ECM tubes provides for the development of electronic components, high power microwave transmitting devices and power generation equipments for advanced air and surface ECM systems. The final project, Target Countermeasures [deleted] to provide the warning of threats to U.S. Navy ships.

Related activities.—Work in other services is monitored for applicability. These projects are prosecuted within the context of airborne EW, command and control system development and Anti-Ship Missile Defense projects.

Work performed.—Naval Research Laboratory, Naval Electronics Laboratory Center, ITT Federal Laboratories, General Telephone and Electronics, Hughes Aircraft and others.

Program accomplishments and future programs:

1. Fiscal year 1971 and prior accomplishments.—The SHORTSTOP prototype systems were installed at Fleet Anti-Air Warfare Training Center and aboard U.S.S. Biddle (DLG-34) for development test and technical/operational evaluation. Radar cross-section data are being taken and reduced for evaluation. Specific high power components have been completed for ECM systems, and the feasibility of both Dual Mode Ships Electronic Countermeasures (ECM) and the Target Countermeasures system were demonstrated.

2. Fiscal year 1972 program.—Complete Operational evaluation of SHORTSTOP aboard U.S.S. Biddle in order that the production decision may be made. Continue development of ECM power components and Radar signature measurment and analysis. Initiated Dual Mode ECM and Target Countermeasures devices.

3. Fiscal year 1973 planned program.—Initiate engineering of specific modules of the SHORTSTOP system (Phase II) in order to support production requirements. Continue ECM components development [deleted]. Continue Dual Mode ECM development. Complete and test the initial Target Countermeasures equipments.

4. Program to completion.—Continue Phase II of SHORTSTOP in order to maintain an enhanced capability mode possible by new techniques and dictated by changes in threat. Complete development of Target countermeasures and Dual Mode ECM system.

RESOURCES

[Dollar amounts in thousands]

	Fiscal year 1971	Fiscal year 1972	Fiscal year 1973	Additional to completion	Total estimated cost
R.D.T. & E., Navy, funds	$11,164	[Deleted]	[Deleted]	Continuing	Not available.
Man-years	32	50	43	Not available	Do.

SURFACE ELECTRONIC WARFARE

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded under this program, the amounts for fiscal years 1971 and 1972, and the request for fiscal year 1973.

(The information follows:)

Project	Fiscal year— 1971	1972	1973
Ships advanced EW (Shortstop)	9,250	[Deleted]	
Radar cross section reduction/surface ships	100		
Advanced ECM tubes	1,500		
Dual mode ECM			
Ship integrated electronic system	14		
Tactical EW deception	300		
Target countermeasures			

Senator YOUNG. I note there is a sizable decrease in fiscal year 1973 when compared to the funds provided fiscal year 1972. Could you comment on this?

Dr. FROSCH. Yes, sir. The major testing milestones have been completed in Shortstop. While this program still requires R. & D. effort a substantial reduction in funding has been realized.

OTHER SURFACE DEVELOPMENTS

Chairman ELLENDER. $5.2 million is requested for the advanced development program entitled "Other surface developments (advanced)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Other Surface Development (Advanced)

Category: Advanced Development

Budget Activity: 5-Ships, Small Craft and Related Equipment

DESCRIPTION: This element is comprised of eight (8) projects:

W4524 - Catapults. This project covers the developments of a new type of aircraft catapult utilizing new energy storage technology and greatly increased automation. The heart of the launching system will be a rotating flywheel which can be brought up to speed and then engaged for the launch. Development includes integrated catapult control station, automatic weighing system to establish launch energy levels, rotary retraction engine for catapult shuttle, catapult end-speed recorder and flush deck shuttle for use with both nose wheel and bridle launch aircraft. The rotary drive catapult will result in a weight reduction of 2,150 tons per ship and a space reduction of 64,000 cubic feet per ship. Fresh water consumption will be practically zero. Personnel needed will be reduced by 73 men through integration of these subsystems into an automatic launch capability.

W4525 - Shipboard Arresting Gear. This project covers development of new type of energy absorber to reduce by 50 percent the weight and bulk of present aircraft recovery systems on carriers. The energy absorber is a "programmed drum" type which will provide the proper energy absorption schedule. The project also includes development of a new control and readiness monitoring system for the arresting gear. The new system will provide a 100 ton weight reduction and a 1400 cubic foot volume reduction, per carrier. Energy absorption capacity will increase to 55 million foot-pounds, and the deck runout will approach the 300-foot distance desired.

W4526 - Visual Landing Aids. The principal systems under development include a color-coded pulsed light device, a new stabilization system employing modern digital techniques, and a television system with night sensitivity and incorporating portable television cameras for remote pickup. The pulse coded optical landing system will permit glide slope acquisition two miles behind the carrier and thus give the pilot an additional minute in which to line up for the landing. This project will also increase the night capability of the Pilot Landing Aid Television (PLAT) system to obtain night-time performance comparable to present daytime operations. Another objective is to provide television monitoring of the catapult approach and hook-up areas to permit surveillance of the entire launch sequence for increased safety in flight deck operations.

W4643 - Thermal Explosion Test and Development. This project will develop data on the behavior of explosive loaded munitions in a fuel fire and utilize these data to modify present explosives to extend cook-off times and minimize damaging effects of exploding or deflagrating munitions in fuel fires.

W4736 - Aircraft and Ordnance Safety. This project is to develop a data base of vulnerability characteristics/phenomena which can be used to design and fabricate prototype systems/subsystems, demonstrate their superiority over alternatives; prove their compatibility with mission objectives, and incorporate them in future designs.

S46XX - Electric Power Systems Solid State Equipment. This project develops solid state electric power frequency and voltage conversion and control equipment with improved reliability and quality of output compared to present equipment. Will replace motor-generator sets. Work includes development of (1) solid state converters to convert 60 hertz general use power to 400 hertz special purpose power; (2) solid state sensing and control for actuating circuit breakers; (3) new, larger size, faster switching, solid state devices for follow-on generations of equipment.

S4632 - Shipboard Auxiliary Systems. This project provides modern, more reliable equipment for various ship systems, so that improved overall ship's machinery, hull and hydromechanics systems will result. Equipment developed is introduced into the Fleet through other programs. New efforts are added as they emerge from exploratory development and are undertaken based on feasibility demonstrated by laboratory model evaluations.

S4643 - Damage Control. This project provides for the development of Advanced Damage Control Systems directed towards rapid suppression of fire; reduction of hazardous materials; enhanced personnel protection and survivability; improved damage control information and control systems; and retention of stability and structural integrity.

WORK PERFORMED BY:

W4524 - Catapults. Naval Air Engineering Center, Philadelphia, Pennsylvania (NAEC)
Naval Air Test Facility, Lakehurst, New Jersey (NATF)
General Electric Company, West Lynn, Massachusetts
Philadelphia Gear Company, Philadelphia, Pennsylvania
E. W. Bliss Company, Bryn Mawr, Pennsylvania
Force Control, Incorporated, Newcastle, Indiana

W4525 - Shipboard Arresting Gear. Naval Air Engineering Center, Philadelphia, Pennsylvania (NAEC)
Naval Air Test Facility, Lakehurst, New Jersey (NATF)
Naval Air Development Center, Warminster, Pennsylvania (NADC)
All American Engineering, Wilmington, Delaware
Vortec Products, Torrence, California
E. W. Bliss Company, Bryn Mawr, Pennsylvania

W4526 - Visual Landing Aids. Naval Air Engineering Center, Philadelphia, Pennsylvania
Naval Air Test Center, Patuxent River, Maryland
National Bureau of Standards, Gaithersburg, Maryland
Systems Technology, Incorporated, Pasadena, California
McDonnell-Douglas Corporation, Long Beach, California

W4736 - Aircraft and Ordnance Safety. Naval Weapons Center, China Lake, California
Naval Missile Center, Point Mugu, California

S46XX - Electric Power Systems Solid State Equipment. Naval Ship Research and Development Center, Annapolis, Maryland
Naval Ship Engineering Center, Washington and Contractors to be selected.

S4632 - Shipboard Auxiliary Systems. Eighty percent of the tasks undertaken are funded in Naval laboratories, the balance by commercial contracts.

S4643 - Damage Control. Naval Resesearch Laboratory, Washington, District of Columbia
Naval Ship Research and Development Center, Annapolis, Maryland
Naval Ordnance Laboratory, White Oak, Maryland
Naval Weapons Center, China Lake, California
Naval Weapons Laboratory, Dahlgren, Virginia
Naval Ship Engineering Center, Philadelphia, Pennsylvania
National Bureau of Standards, Washington, District of Columbia
Factory Mutual Insurance Company
W. R. Grace Company.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program:

W4524 - Catapults. Operating tests of the rotary catapult system will continue to check the system alignment and compatibility of the components. The test site will be modified to accept a new wet clutch design. Preliminary shipboard testing of the aircraft weighing system will be completed and procurement of preproduction hardware will be initiated. Aircraft compatibility tests of the flush deck nose gear launch equipment will be accomplished. Design of the final version of the integrated catapult control station will be completed. System study and design will be accomplished for an automatic catapulting system.

W4525 - Shipboard Arresting Gear. Advanced development model of deck pendant arresting gear will be fabricated. Design of advanced development model of barricade arresting gear will be completed. Design of control system for retrofit to Mark 7 arresting gear will be accomplished.

W4526 - Visual Landing Aids. The brassboard model of the pulse coded optical landing system will be installed at Naval Air Test Center and flight tests will be initiated. Specifications and drawings will be completed for procurement of the stabilization system.

U4643 - Thermal Explosion Test and Development. No funds.

W4736 - Aircraft and Ordnance Safety.

a. Development of aircraft fuselage fuel cell
b. A-4 and A-7E aircraft tank evaluations against various projectiles
c. Fire protective design approaches will be evaluated and prototyped
d. Second-stage F-14 mockup evaluations against range of projectiles
e. Aircraft-installed thermal foam evaluations under simulated flight deck/hangar deck fire
f. Further development of "vulnerability kits" for existing Navy strike aircraft
g. Missile pyrotechnic, aircraft gun ammunition and ordnance cook-off evaluations.

S46XX - Electric Power Systems Solid State Equipment. Not applicable. New start in Fiscal Year 1973.

S4632 - Shipboard Auxiliary Systems. A minimal effort necessary to protect the Navy's investment in several small projects is in force due to funding constraints. Effort is concentrated on non-lubricated compressors and lifeboats.

S4643 - Damage Control. Continue work on fire extinguishing systems on ships; Aqueous Film Forming Foam (AFFF) sprinkling system for machinery space fires; improved foam proportioners; agent or system solution to problem of generating high expansion foam with contaminated air; electrostatic precipatators for smoke removal. Investigate reduction of fire hazard of habitability items. Complete development of fire retardant additives for plastics. Complete evaluation of requirements for aids to egress from ships compartments during emergencies. Initiate analysis of detection and alarm systems and the numerous machinery/hull systems vital to damage control.

FY 1973 Planned Program:

W4524 - Catapults. Testing of the advanced development model of the rotary drive catapult, the engineering evaluation of the prototype aircraft weighing system and advanced development of the flush deck nose gear launch equipment will be completed. Procurement will be initiated for components of the automatic catapulting system.

W4525 - Shipboard Arresting Gear. Deck pendant arresting gear will be installed and functionally tested. Barricade arresting gear will be manufactured for testing. Control system for deck pendant arresting gear will be designed. Development of improved control and readiness system for Mark 7 will be completed.

W4526 - Visual Landing Aids. Tests of the pulse coded optical landing system will be completed and a data package will be prepared for procurement of the system.

U4643 - Thermal Explosion Test and Development.
a. Establish standard large-scale cook-off test
b. Correlate large-scale and small-scale cook-off tests
c. Measure cook-off characteristics of explosives with small-scale test
d. Study confinement effects on the cook-off reaction of service explosive
e. Provide cook-off requirements to weapon developers for each weapon type

W4736 - Aircraft and Ordnance Safety.
a. Continued evaluation of design techniques aimed at aircraft and vulnerability reduction
b. Emphasis will shift to newer aircraft being prototyped for fly-off competition an potential procurement
c. Determine explicit tradeoff potential and achieve a closer compatibility between physical hardware and operational practice
d. New design concepts will be prototyped and subjected to both projectiles and flight deck fires
e. Evaluation of personnel escape/survival systems and miscellaneous ordnance
f. Continued weapon cook-off testing.

S46XX - Electric Power Systems Solid State Equipment. Specifications will be prepared and contracts awarded for frequency converters, solid state circuit breakers, controls and power semiconductor devices. System simulation analysis will be initiated by Naval Ships Research and Development Center, Annapolis, Maryland.

S4632 - Shipboard Auxiliary Systems. Minilube compressor testing and evaluation will continue, a 5 ton (10 module) thermoelectric air conditioning system will undergo evaluation on a submarine, water jet pump tests, a novel 25 man inflatable life boat with a hand powered reverse osmosis portable water system, fluidic controllers, machinery performance monitoring and some electronic solid state controllers will be evaluated.

S4643 - Damage Control. Investigate toxicity, corrosion, other undesirable features of new extinguishing agents; installed ventilating systems as means of smoke removel under fire conditions will be examined. Develop understanding of fire propagation in materials and compartments. Development of methods and equipment to facilitate assessment of damage to the ship will be undertaken. Improve closures for watertight doors and hatches.

Program to Completion:

W4524 - Catapults. Fleet evaluation of the aircraft weighing platform will be completed in Fiscal Year 1974. The automatic nose gear launch system will be completed and evaluation accomplished in Fiscal Year 1976.

W4525 - Shipboard Arresting Gear. Advanced development of the deck pendant arresting gear will be completed in Fiscal Year 1974. Advanced development of the barricade arresting system and the new control and readiness system will be completed in Fiscal Year 1975. Engineering development will be completed in Fiscal Year 1977.

W4526 - Visual Landing Aids. Tests of the low light level television system will be completed in Fiscal Year 1974, using infrared illuminators, if necessary. A prototype system will be fabricated, incorporating modifications based on the test results. A complete deck monitoring system will be developed. An improved flight deck lighting system will be developed.

W4736 - Aircraft and Ordnance Safety. Complete the "asset-threat" matrix, a compilation of major aircraft and weapons systems and the range of threats and operational hazards which pose a challenge to mission completion. Project work will consider the merged strike-Anti Submarine Warfare (ASW) air wings, small aviation ships and aircraft types.

S46XX - Electric Power Systems Solid State Equipment.

Complete Construction of Prototype Converters	Dec 75
Complete Evaluation of Circuit Breaker Controls	Jan 76
Complete Laboratory Technical Evaluation of	Jul 76

Prototype Converters	
Complete Operational Evaluation of Prototype Converters aboard ship	May 77
Complete Data Package Verification	Jun 77
Complete Product Engineering of Semiconductors	Jul 77

S4632 - Shipboard Auxiliary Systems. Additional components will be selected for advanced development as funding permits.

S4643 - Damage Control. A total program will be pursued for development of new materials and techniques that will substantially reduce the vulnerability of carriers and other ships to damage from hazardous materials and accidental or battle damage. The development will result in alterations to existing ships and improved design criteria for new ships.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	7,639	6,721	5,194	Continuing	Not applicable

OTHER SURFACE DEVELOPMENTS

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded under this program, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. Yes, sir; I will be happy to.

(The information follows:)

[Funds in thousands]

	Fiscal year—		
	1971	1972	1973
Catapults	1,086	960	765
Shipboard arresting gear	783	1,060	915
Visual landing aids	691	200	190
Electric power system-solid state			840
Shipboard auxiliary systems and development	2,729	1,912	425
Thermal explosion test/development			250
Damage control	1,000	1,064	859
Surface ship bridge control system			100
Aircraft and ordnance safety	1,350	1,525	850

Chairman ELLENDER. I note that the funds requested for this program for fiscal year 1973, are some $1.5 million less than the funds provided in fiscal year 1972. Could you comment on the reason for this.

Dr. FROSCH. Because of overall budget constraints for fiscal year 1973, the funding for this program was reduced to accommodate other higher priority programs.

Senator YOUNG. Are you requesting funds for any projects which have not been funded in prior years? If so, please comment on each of them briefly.

Dr. FROSCH. Yes, sir. The project entitled "Electric Power Systems Solid State Equipment" is funded for the first time in fiscal year 1973. This project will develop solid state 60 hertz to 400 hertz frequency conversion equipment to replace existing motor-generator sets aboard ships. The solid state equipment will be smaller, lighter, and more easily maintained than the existing motor-generator sets. In addition, 400 hertz frequency conrol will be more accurate with the solid state equipment.

The project entitled "Thermal Explosion Test and Development" will develop data on the behavior of explosive-loaded munitions in a fuel fire and utilize these data to modify present explosives to extend cook-off lines and minimize damaging effects of exploding or deflagrating munitions in fuel fires.

SURFACE ELECTRONICS

Chairman ELLENDER. $1.8 million is requested for the program entitled "Advanced Surface Electronics." Please give us a description of this program.

Dr. FROSCH. I will furnish that information for the record.

(Classified information was furnished to the committee.)

Chairman ELLENDER. Are you requesting funds for any projects which have not been funded in prior fiscal years? If so, comment upon its objectives.

Dr. FROSCH. Yes, sir. We have a project being initiated in fiscal year 1973 entitled "Ships Electromagnetic Effectiveness." The objective of this program is to develop analytical techniques, procedures, and models which will adequately define the ship's electromagnetic environment and determine the interactions between electronic subsystems and between electronic systems and ship architecture.

Senator YOUNG. The $1.8 million requested for fiscal year 1973 for surface electronics is $1.3 million more than was provided for fiscal year 1972. What has caused such a large increase in this program?

Dr. FROSCH. In addition to the new start of ships electromagnetic effectiveness which raised fiscal year 1973 funding by $250,000, the other two projects funding also increased. Both projects are relatively new; ECCM/module development and shipboard OTH technology were initiated in fiscal years 1971 and 1972 respectively. Both projects are expanding as planned.

LOGISTICS

Chairman ELLENDER. $800,000 is requested for a program entitled "Advanced Logistics." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Logistics (Advanced)

Category: Advanced Development

Budget Activity: 5-Ships, Small Craft and Related Equipment

DESCRIPTION:

The program element consists of two projects: Underway Replenishment (S41-06) and Navy Logistics Information System (NAVLIS) (T 41-12).

The objective of NAVLIS is to achieve a cost sharing capability through the net working of existing and planned logistics information systems. Rather than replace existing systems it permits them to operate more efficiently through the reduction of costly, duplicative input, storage, processing and output of data, and more effectively through providing additional relevant information to Navy Logistics decision makers at all levels.

WORK PERFORMED BY: Naval Electronics Laboratory Center (NELC), San Diego, California, Naval Command Systems Support Activity (NAVCOSSACT), Washington Navy Yard, Washington, D. C., North American Rockwell Information Systems Company, Anaheim, California, Logistics Management Institute (LMI), Washington, D. C., Norfolk Naval Shipyard, San Francisco Naval Shipyard, Naval Ship R&D Center, Annapolis, Maryland, Naval Weapons Handling Laboratory, Earle, New Jersey, Naval Ship Engineering Center, Washington, D. C.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program: None

FY 1973 Planned Program: Studies of Data Processing Requirements, Analysis of Information Exchange, Communications Network Simulation, Universal Data Elements, Software Languages, Information Flow and testing of outputs in a real-world environment for practicality and cost effectiveness. Four of the ADO Tasks will be completed (Current Systems Inventory, Information Requirements, Communications, and Data Processing Hardware). Completion of these tasks/milestones is crucial to a CNO decision on Concept Certification leading to Engineering Development Scheduled for FY 1975 and Initial Operational Capability scheduled for 1978-1980 on a modular, incremental basis.

Program to Completion: Upon completion of satisfactory testing of the NAVLIS total system model, construction of the prototype operational model will begin.

Continue development of underway replenishment systems with emphasis on containerized handling of ammunition and other ca

RESOURCES ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	1,379	0	800	continuing	N.A.

LOGISTICS

Chairman ELLENDER. I note that the entire $800,000 requested for this program is for the project entitled "Navy Logistics Information System." I also note that $500,000 was provided in fiscal year 1971 for this project, and no funds were provided in fiscal year 1972. Would you comment on this?

Dr. FROSCH. I will be glad to do so. In fiscal year 1972, we needed money for several critical new starts so therefore NAVLIS was not funded.

Senator YOUNG. Would you comment on the objectives of the planned program for fiscal year 1973?

Dr. FROSCH. The NAVLIS goals are consistent with the DOD logistics plan. These goals are identification of duplicative ADP resources improvement of system responsiveness to management, reduction in reporting requirements, and improved data reliability. The fiscal year 1973 program, will continue the experiments and demonstrations that will put realistic dollar values on the achievement of these goals.

REACTOR PROPULSION PLANTS

Chairman ELLENDER. $41.8 million is requested for the continuing advanced development program entitled "Reactor Propulsion Plants (Advanced)." Can you give us a brief unclassified description of the general objectives of this program?

Dr. FROSCH. The objective of this program is the development of improved nuclear propulsion plants for specific shipboard applications. Subsumed in this objective is development effort toward increased core life, increased resistance to shock, maximum reliability required by the mission of the ships and, in the case of submarines, minimum noise generation.

Chairman ELLENDER. Please provide a tabulation listing the projects to be funded under this program, the amounts for each fiscal years 1971 and 1972 and the request for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

[In millions of dollars]

Project	Fiscal year— 1971	1972	1973
S4601 A4W/A1G—Nuclear propulsion plant (2 reactor nuclear propulsion plant being installed in Nimitz (CVAN-68) class aircraft carriers)	8.7	9.1	[Deleted]
S4604 S5G—Natural circulation nuclear propulsion plant	1.6	1.7	
S4612—Small combatant nuclear propulsion plant	6.5	7.8	
S4637 S6G—High-speed nuclear attack submarine propulsion plant	5.0	5.2	
S4651—Advanced design submarine nuclear propulsion plant	10.2	10.6	

Chairman ELLENDER. Of the total requested, [deleted] is for the continuation of development of the nuclear propulsion plants for the *Nimitz* class carriers. What is the current status of this effort and what are you planning for fiscal year 1973?

Dr. FROSCH. Design, development, and fabrication of propulsion plant components and systems is continuing. Specific areas of develop-

ment included reactor vessels, control rod drive mechanisms, steam generators, pressurizers, electrical equipment, valves, and pumps. Work is underway on substantially all electrical and mechanical systems. Extensive testing and evaluation of prototype components has been underway [deleted].

Testing and evaluation of components and systems will continue in order to verify design parameters. Refueling and reactor servicing equipment development will be ongoing as will preparation and review of the propulsion plant operating instructions and reactor plant manual. Lead ship component and system testing will continue in conjunction with delivery and installation of shipboard propulsion plant components. Testing program emphasis will be placed on assuring compatibility with the advanced core being developed by the Atomic Energy Commission for this plant. Propulsion plant development and testing is being carefully coordinated with the aircraft carrier shipbuilding schedules.

Senator YOUNG. [Deleted] is for the project entitled "Natural circulation nuclear propulsion plant." Please comment on this project.

Dr. FROSCH. The purpose is to develop a natural circulation nuclear propulsion plant [deleted]. Plant performance review and evaluations will continue and design predictions will be compared with observed performance. Improved plant components and systems will be identified through extensive plant testing and evaluation programs.

Chairman ELLENDER. [Deleted] is requested for the project entitled "D2W—Nuclear propulsion reactor." Please comment on the objectives of this project and tell us what you hope to accomplish in fiscal year 1973.

Dr. FROSCH. The objective of this project is to develop a reactor which incorporates advances in all applicable technological areas of system and component design and which is suitable for use in DLGN 36 and 38 class frigates [deleted].

In fiscal year 1973, emphasis will be placed on [deleted].

Senator YOUNG. Of the total requested, [deleted] is for the project entitled "High speed nuclear attack submarine propulsion plant". Please comment on the objectives of this program and your planned program for fiscal year 1973.

Dr. FROSCH. The objective is to provide a propulsion plant in the near term for higher speed submarines to counter the growing Soviet submarine threat.

This plant, [deleted] is being installed in the *Los Angeles* (SSN–688) class high speed nuclear attack submarines which are currently under construction. [Deleted.]

During the coming year, detailed operating instructions for the propulsion plant will be prepared and plant safety analyses performed. [Deleted.]

Chairman ELLENDER. [Deleted] is requested for the project entitled "Advanced design submarine nuclear propulsion plant". Comment on this program and tell us why you need the very large increase you are requesting for fiscal year 1973.

Dr. FROSCH. The purpose of this project is to develop an advanced submarine nuclear propulsion plant that will provide [deleted].

The [deleted] requested for fiscal year 1973 is required in order to move development along at a rate to enable this propulsion plant to

be ready to enter service [deleted]. The development pace is gaged to complete the propulsion plant development in a reasonable period of time while keeping the overall development cost at a minimum.

PORTABLE NUCLEAR ELECTRIC POWER PLANTS

Chairman ELLENDER. Of the total requested for ships, small craft and related equipment, $500,000 is for the advanced development program entitled "Nuclear electric powerplants (advanced)—Portable nuclear electric powerplants". Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E,N DESCRIPTIVE SUMMARY

Title: Nuclear Electric Power Plants

Category: Advanced Development

Budget activity: 5 - Ships, Small Craft and Related Equipment

DESCRIPTION: Conference on Energy Sources of Extended Endurance in 1-100KW(e) Range for Naval Applications was held at National Academy of Sciences April 1967 under auspices of Committee on Undersea Warfare and Office of Naval Research. Panel recommended an orderly R&D program be pursued by AEC to develop small nuclear power sources in two basic ranges - 1-15KW(e) (radioisotope) and 100KW(e) to 2MW(e) (reactor) - and that Navy support AEC efforts. Nuclear electric generating systems are only ones capable of unattended operation underwater for a period of years in support of deep ocean military requirements. Experience in support of this rationale is now being obtained in CNM directed radioisotope power generator program. NAVFAC-ENGCOM designated principal developmental activity. August 1968 AEC, at Navy's request and with Navy funding, commenced Task I, parametric analysis of candidate systems and supporting technologies for 2-10KW(e) radioisotope PNEPP. Task I completed August 1969, and Task II, conceptual designs, commenced November 1970. Task III, technology evaluation, commenced April 1970 in support of Task II designs. June 1970 AEC commenced survey current nuclear reactor technologies and concepts which could potentially satisfy requirements in 150-500KW(e) power range.

Both power sources are suitable for following applications: ASW, U.S. Coast Guard and other undersea non-propulsion programs, remote weather stations, unattended navigational aids and stations, advanced bases, communications stations, inland Antarctic stations, contingency operations.

2-10KW(e) -- Preliminary designs indicate power source will operate continuously and unattended for 5 years initially at depths to 6000 feet without logistic support. Will feature heat source containing 5 megacuries of $SrTiO_3$, and produce nominal 2KW(e) (Thermoelectric) or 5KW(e) (Organic Rankine). Overall plant weight including pressure vessel about 30,000 pounds. Plant size, a cylinder, 5 feet diameter and 10-13 feet high. Present design directed toward assuring all components comply with national and international safety regulations and compatible with environment.

150-500KW(e) -- Insufficient information to be specific about this power source. Design objectives include portable, unattended or limited attendance, continuous operation for 2-5 years, fuel cycle lifetime 2-5 years. Weight as low as 10,000 pounds or as high as 150,000 pounds.

WORK PERFORMED BY: Oak Ridge National Laboratory (ORNL). Final contractor not designated.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAM:

2-10KW(e) Radioisotope PNEPP

FY 1972 Program: Continue technology evaluation, iterating results into Task II reference designs. Conduct technical audit June 1972 to determine if program properly tracking initial objectives and expenditure estimates.

FY 1973 Planned Program: Complete technology evaluation and final reference designs by January 1973. ORNL prepare development plan estimating time and cost to bring each system through prototype testing stage. Request For Proposal (RFP) to industry prepared for final design, fabrication and testing (8000 hour test) of prototype power source.

Program to Completion: Anticipated Milestones:

Jan 1973 - Development Plan Completed
Jun 1973 - RFP to Industry
Oct 1973 - Initiate Final Design
May 1974 - Initiate Prototype Construction
Jan 1975 - Begin 8000 Hour Endurance Test
Jan 1976 - Deliver Prototype to Navy for OPEVAL

150-500KW(e) Reactor PNEPP

FY 1972 Program: Complete initial industry survey and deliver report, including AEC recommendations, to Navy for evaluation by June 1972.

FY 1973 Planned Program: Pending outcome of reactor Task I study, anticipate more comprehensive conceptual designs will be prepared for more promising concepts from Task I.

Program to Completion: Complete design and construction of prototype plant. Conduct testing and evaluation of prototype. Conduct training program for Navy maintenance technicians and operators.

RESOURCES: ($ in thousands)

	FY 1971	FY 1972	FY 1973	Additional To Completion	Total Estim. Cost
RDT&E,N	600	500	500	Continuing	Continuing

PORTABLE NUCLEAR ELECTRIC POWER PLANTS

Chairman ELLENDER. It would appear that this program is continuing at the same level as in fiscal year 1972. Is this correct?

Dr. FROSCH. Yes, sir; the funding request is at the same level as last year.

Senator YOUNG. Just what will you do with the $500,000 you are requesting?

Dr. FROSCH. We will complete proof testing of components of the 2–10-kilowatt radioisotope thermoelectric generator, most of which are under test at this time. Modifications will be made as necessary. Specifications and final conceptual design for the prototype radioisotope thermoelectric generator will be completed by late fiscal year 1973. It is planned to award the prototype final design contract in early fiscal year 1974.

SUBMARINES (ADVANCED)

Chairman ELLENDER. $5.6 million is requested for the advanced development program entitled "Submarines (Advanced)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

SUBMARINES (ADVANCE)

Description.—The projects in this element are AGSS Sonar (S2305), Submarine Sonar System Advanced Development (S2326) and HY–130 steel (S2336). The AGSS sonar includes the design, development, fabrication and evaluation of a research sonar suit for the USS DOLPHIN (AGSS 555) deep diving submarine. This submarine will be used to assess the tactical and technical significance of deep diving combatant submarines. The Submarine Sonar System Advanced Development will pursue advanced development and tests of promising sonar subsystems which are needed in all phases of target acquisition and data analysis against underwater weapons, submarines and surface ships. The output from this project will support modular improvements to existing sonars to keep our first line SSN's current to the threat and provide baseline sonars for specific new submarine programs such as Undersea Long Range Missile System (ULMS) and the Mid–70's SSN. Navy experience in bringing HY–80 directly from the laboratory to the submarine building program without a large scale pre-construction hull and shipyard certification program was very expensive in terms of high cost in development dollars and delayed ship delivery schedules. The HY–130 steel project provides for the development of proven HY–130 submarine hull construction specifications through a pre-construction development effort including design, shipbuilder qualifications, welded fabrication, nondestructive and destructive testing and inspection and simulated service testing of scale model and full size pressure hull sub assemblies representative of those planned for future submarine designs.

Work performed by:

a. *AGSS Sonar (S2305):* Naval Undersea Research and Development Center, San Diego, Cal.; Marine Physical Laboratory, San Diego, Cal.; Straza Industries, San Diego, Cal.; Litton Systems, Van Nuys, Cal.

b. *Submarine Sonar Adv Dev (S2326):* Naval Undersea Research and Development Center, San Diego, Cal.; Naval Ordnance Laboratory, White Oak, Maryland; Challenger Research Incorporated, Rockville, Maryland; Bolt, Beranek and Newman, Inc., Cambridge, Mass.; Naval Underwater Systems Center, New London, Conn.

c. *HY–130 Steel (S2336):* Mare Island Naval Shipyard, Vallejo, Cal.; General Dynamics, Groton, Conn.; Newport News Shipbuilding & Drydock Co.; Newport News, Va.; Portsmouth Naval Shipyard, Portsmouth, N.H.; Litton, Pascagoula, Miss.; Naval Ship Research and Development Center, Annapolis, Md.; Naval Ship Engineering Center, Hyattsville, Md.; Naval Ship Research and Development

Center, Carderock, Md.; Naval Ship Research and Development Center Underwater Explosion Research Division, Portsmouth, Va.; Naval Research Laboratory, Washington, D.C.; U.S. Steel Corp., Pittsburgh, Pa.; Lukens Steel Company, Coatesville, Pa.; Curtiss Wright Corp., Buffalo, New York; Jorgensen Steel, Seattle, Wash.; Union Carbide Corp.; Line Division, New York; McKay Company, Pittsburgh, Pa.; Airco, Welding Products Division, Sparrows Point, Md.

Fiscal year 1972 Program:

a. *AGSS Sonar (S2305):* The DOLPHIN Sonar program includes a phased upgrading of the basic sonar suit following each major research cruise. During the Fall 1971 when USS DOLPHIN is in a shipyard restricted availability status (including replacement of the main batteries), the sonar system capability will be augmented, particularly in the areas of Automatic Data Processing. At present, software (and certain hardware) limitations exploit only 25% of the usable capacity of the Litton computer. Concurrently, Naval Underwater Center personnel will complete the analysis and detailed reporting of the Alaskan cruise, of FY 1971. In January 1972 research cruises along the Pacific coast will begin and continue throughout the calendar year. [Deleted.]

b. *Submarine Sonar Adv Dev (2326):* Refurbish, redesign, construct and install equipment for at-sea tests and data collection of the Wide Aperture Array Concept. Conduct studies on integrated display formats, data flow and data handling requirements and hardware integration of ancillary subsystems functions. Determine computer and display requirements for implementing and programming algorithms.

c. *HY–130 Steel (S2336):* Complete construction of the intermediate-scale HY–130 models. Complete construction of the large scale model sections and initiate assembly. Initiate environmental/weapons testing of the intermediate-scale models. Initiate contruction/service testing of the small-scale basic static/fatigue verification models to validate HY–130 design procedures. Complete construction of the end ballast tank structure for the full-scale model.

Fiscal year 1973 Planned Program:

a. *AGSS Sonar (S2305):* Primary emphasis, as in FY 1972, will be placed on a vigorous sea test program. System upgrading will continue, with specific emphasis on navigation to explore the tactical utilization of a submarine having deep submergence capability.

b. *Submarine Sonar Adv Dev (S2326):* Design and execute at-sea tests of rapid mode ranging subsystem on board SSN. Conduct Wide Aperture Array (WAA) and window test in pond. Develop, test and refine in situ performance prediction and mode selection algorithms. Complete analysis of WAA see data. Provide design information as required for preparation of performance specifications during contract design phase of specific platform programs. Complete specifications for the contract design of the Advanced High Performance SSN sonar.

c. *HY–130 Steel (S2336):* Complete assembly of the three large-scale models. Complete service testing of the intermediate-scale models. Initiate static/fatigue testing of the 7/10–scale Fatigue model. Complete construction and service testing of the first series of small-scale design criteria verification models.

Program to Completion:

a. *AGSS Sonar (S2305):* Efforts will follow the same pattern as in previous years. The specific trials and development will be oriented to meet the detailed requirements of the mid 70's SSN, Undersea Long Range Missile System and/or other major combatant sonar programs.

b. *Submarine Sonar Adv Dev (S2326):* It is planned to perform advanced development and testing of promising subsystems such as: Wide Aperture Array, [deleted]. The improvements coming from these efforts will assure early and economical introduction by modular replacement into existing first line combatant sonar systems, thereby maintaining capabilities current to the threat.

c. *HY–130 Steel (S2336):* Complete construction of various models and testing including underwater explosive tests, static/collapse tests and controlled cracked hull tests to support certification of HY–130 steel construction of a prototype submarine FY 76/77. Complete necessary documents to support the prototype and follow on combatant submarine class construction using HY–130 steel.

Resources (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, 6,000; fiscal year 1972, 5,993; fiscal year 1973, 5,561; additional funds to completion are continuing; and the total estimated cost is not available.

SUBMARINES

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded under this program, the amounts for each for fiscal years 1971 and 1972 and the request for fiscal year 1973.

Dr. FROSCH. I will be happy to do so.

(The information follows:)

	Fiscal year—		
	1971	1972	1973 request
AGSS sonar	2,000	1,585	1,556
Subsonar, advance development			1,500
HY-130 steel	4,000	4,908	2,505

Chairman ELLENDER. Of the total requested, $1.6 million is for "AGSS Sonar (Dolphin)." Would you give us a brief description of this project, and tell us what you will do with the funds you are requesting for fiscal year 1973.

Dr. FROSCH. AGSS sonar is a program to investigate the possible tactical use of [deleted]. The program for fiscal year 1973 will place primary emphasis on a vigorous at-sea test program. The sonar system will be upgraded in performance with specific emphasis on navigation to explore the tactical use of a submarine having deep submergence capability.

Chairman ELLENDER. $1.5 million is for what appears to be a new project entitled "Submarine Sonar System Advanced Development." What are the objectives of this program?

Dr. FROSCH. The objectives of this new project are (1) to provide modular improvements to existing SSN sonars, and (2) to provide a base line sonar for use in undersea long-range missile system submarines and future SSN designs.

Senator YOUNG. What will you do with the $1.5 million you are requesting for fiscal year 1973?

Dr. FROSCH. The $1.5 million requested in fiscal year 1973 is to support at-sea tests, and analysis of data for a [deleted].

Chairman ELLENDER. $2.5 million is for the continuation of the development of HY-130 steel. How will you use these funds?

Dr. FROSCH. The $2.5 million requested in fiscal year 1973, is to complete construction and service testing of intermediate scale models and complete construction and start testing of small scale design criteria models. Simulated service testing will be completed on the small scale stiffened hemihead model.

Senator YOUNG. Your request for HY-130 steel for fiscal year 1973 is about $1.9 million less than the amount provided for fiscal year 1972. What has brought about this decrease?

Dr. FROSCH. The Navy has extended the development of HY-130 an additional 2 years resulting in a decreased amount of money required per year in this program.

SUBMARINE TACTICAL WARFARE SYSTEMS

Chairman ELLENDER. [Deleted] is for the classified program entitled "Submarine Tactical Warfare System (Advanced)—BLUE MAIL." Has the committee been provided with complete details on this effort?

Dr. FROSCH. Yes; it has.

COMMUNICATIONS SYSTEMS

Chairman ELLENDER. [Deleted] million is for the continuing engineering development program entitled "Communications Systems." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Description.—This element includes major communication systems under development for fleet use. It includes:

S32-03—Submarine Integrated Antenna System. This antenna system development will incorporate a multiplicity of technical advances addressing the broad front of existing submarine communication problem areas: the environment and its demands on material and component integrity, speed capability and concomitant hydrodynamic forces imposed on structures and [deleted] antenna devices, depth capabilities and associated pressure forces and limited fairwater space available to meet all antenna requirements.

X32-15—HARPY. Shipboard and airborne UHF communication system to provide reliable, line of sight [deleted] communications for voice and data links.

X32-56—Data Terminal System. Terminal system to provide long range communications of cryptographically secure data using either high frequency (HF) or ultra-high frequency (UHF) transmissions. System will automatically handle a variety of input/output interfaces and provide error control to accommodate individual user requirements. This terminal system will provide a 32-fold increase in the transmission rate of data communications.

X32-85—Traffic Management and Systems Control for Nuclear Attack Carrier (CVAN 68). The Message Processing and Distribution System (MPDS) is a digital store and forward message switching system which processes, stores, log and internally distributes record message traffic on-line with radio receiving and transmitting equipment. The Facility Control System (FCS) enables the operator to accomplish assignment and on-line monitoring of circuit configuration and transmitter and receiver frequencies. FCS aid the operator and technician in restoring circuit quality.

Work performed by.—Naval Electronics Laboratory Center, San Diego, California; Naval Research Laboratory, Washington, D.C.; Naval Underwater Systems Center, New London, Connecticut; Naval Research and Development Laboratory, Carderock and Annapolis, Maryland; Development contractors selected as necessary. Participating companies are Magnavox Research Laboratory, Booz-Allen Research Incorporation, Radio Corporation of America, International Telephone and Telegraph, Motorola, Sanders, Union Carbide, Collins Radio and Hydrospace Corporation.

Fiscal year 1972 Program:

a. Submarine Integrated Antenna System. [Deleted.]

b. HARPY. Laboratory tests of Advanced Development model systems completed. System will be tested in fleet environment on ships and aircraft to evaluate performance and determine [deleted] compatibility.

c. Traffic Management and System Control for Nuclear Attack Carrier (CVAN 68). Composite, integration and performance tests completed. Operational Assist Test will be completed using nucleus CVAN-68 personnel augmented by additional fleet personnel to verify operational suitability.

FY 1973 Planned Program:

a. Submarine Integrated Antenna System. [Deleted.]

b. HARPY. Analyze and evaluate fleet development tests. Prepare system specifications for engineering development.

c. Data Terminal System. Prepare system design specification and award engineering development contract for three prototype systems.

d. Traffic Management and System Control for Nuclear Attack Carrier (CVAN 68). Message processing and Distribution System and Facility Control System will be delivered as Government Furnished Equipment to shipbuilder. Post installation performance testing will be conducted on board CVAN 68.

Program to Completion:

a. Submarine Integrated Antenna System. [Deleted.]

b. HARPY. Complete engineering development and conduct operational evaluation.

c. Data Terminal System. Complete engineering development and conduct operational evaluation.

d. Traffic Management and System Control for Nuclear Attack Carrier (CVAN 68). Demonstrate operational performance during builder's trials and post commissioning tests.

Resources (in Thousands of dollars:)

R.D.T. & E.N. Funds for fiscal year 1971, 8,112; fiscal year 1972, [deleted]; fiscal year 1973, [deleted]; additional funds to completion are continuing; and the total estimated cost is not available.

COMMUNICATIONS SYSTEMS

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded with these funds, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

	Fiscal year—		
	1971	1972	1973
Submarine integrated antenna system	3,856	[Deleted]	
Data terminal system	0		
Traffic management system control	2,941		

Chairman ELLENDER. In the project listing for communications systems, there seem to be only three projects, however, in the descriptive summary, you refer to a fourth called HARPY. Will you comment on this project, and tell us why it is missing from the project listing?

Dr. FROSCH. HARPY is a project to develop an [deleted] Ultra High Frequency (UHF) communications system for ships, aircraft, and shore platforms. Advanced development HARPY equipment has completed extensive laboratory testing. Shipboard and aircraft installations were scheduled for testing in the fleet environment in last quarter of fiscal year 1972. Funds have not been requested for Project HARPY in fiscal year 1973, pending analyses and evaluation of fleet test data.

Chairman ELLENDER. $1 million is requested for the project entitled "Data Terminal Systems." Would you comment on this request?

Dr. FROSCH. I will be glad to do so. This project will provide a high-speed terminal for point-to-point crypto secure data. It will replace current systems operating at slow speeds. The fiscal year 1973 funds will be used to prepare system specifications and procure four prototype systems.

Senator YOUNG. Comment on your request for $1 million for "Traffic Management and System Control."

Dr. FROSCH. This money will be used to complete the testing of the automated communication system for the U.S.S. *Nimitz* (CVAN 68). It will also be spent for dismantling and shipping the system to Newport News, Va. Also included in this funding is the post installation operating performance tests on board *Nimitz*.

Chairman ELLENDER. Of the total requested for communications systems, [deleted] is for the project entitled "Submarine Integrated Antenna Subsystems." What are the objectives of this project, and what do you plan to do with the [deleted] you are requesting?

Dr. FROSCH. The objectives of th project entitled "Submarine Integrated Antenna Subsystems" are: [Deleted.]

The funds will support evaluation and development of improvements for the SSN communications buoy, development of a signal distribution system for the 637 and 688 class SSN, evaluation of [deleted] communications antenna.

SURFACE ELECTRONIC WARFARE

Chairman ELLENDER. [Deleted] is requested for the continuing engineering development program entitled "Surface Electronic Warfare (Engineering)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

SURFACE ELECTRONIC WARFARE (ENG)

Background.—This program will improve the defensive and offensive Electronic Warfare posture of the Fleet by engineering development and testing of passive and active electronic warfare equipments for shipboard use. The operations in Electronic Warfare are surveillance (early detection of radio or microwave frequency radiation and determination of direction and characteristics of emissions), classification/identification (identify source and provide threat warning) and countermeasures (deny or provide false location identification to enemy sensors through jamming/deception, defeat homing weapons by inducing errors in weapons homing systems and/or providing alternate targets, and/or providing early target acquisition data to own weapons systems).

Description.—This program elements includes the following projects:

(1) Tactical Electronic Warfare Deception (Mobile Surface Decoy) for shipboard utilization. The Tactical Electronic Warfare Deception Systems (TEWDS) program is providing a family of ship decoys to defend naval ships against the Soviet anti-shipping missile threat.

[Deleted.]

(2) Ths project will develop and integrate a multisensor [deleted] data system aboard fleet units [deleted]. Current automated data links will link the sensors onto own ships CIC and thence to force and fleet commanders. The sensors will be packaged to serve to augment the capability of a specific number of this class ship, to allow these ships to be used as scouts. [Deleted.] The sensors will supplement normally installed sensors [deleted]. In addition data from the various sensors will be recorded for later detailed analysis at facilities ashore.

(3) The Anti-Ship Missile simulation (Effectivness of Navy (EW systems) project will provide a capability to simulate the various anti-shipping missile threats [deleted]. A methodology of quantitatively evaluating EW systems against these threats, by simulation, is being developed. Libraries of candidates and requirements are continuously being updated.

(4) The Beach Jumper Integrated System is for the purpose of developing capabilities [deleted].

(5) The Ships Electronic Warfare Quick Reaction Concept project is to improve, in a QRC time frame, the defensive EW posture of the Fleet as new intelligence data and/or situations dictate, and is used to develop electronic warfare devices to counter immediate threats to naval forces where normal development cycles are too long to provide timely benefits to the forces. Specific tasks will be assigned as threats are identified and as situations dictate. Developments under this project includes only those efforts which result from a need for immediate response to threat capabilities where normal development cycles are too long to provide timely benefit to the fleet. These urgent requirements also preclude normal development and budget planning.

(6) The Threat Detector project will develop and integrate a cost/effective electronic warfare intercept receiving system with appropriate radar, [deleted] surveillance equipments and data processing circuitry to provide timely trheat detection information [for Underway Replenishment group, small escort and other auxiliary type ship.] The techniques for fabricating the entire system are known as a result of efforts in exploratory and advanced development.

(7) Low Cost EW Suite will provide the program to solicit imaginative proposals for new design concept for a shipboard EW suite. The project will allow maximum initiative from industry which may involve new design, redesign of current equipments and modularization for use in the maximum number of surface and air platforms. Industry will be allowed to project the trade-off of passive, passive with electronic countermeasures, and passive with other countermeasures. The specific target is to provide a minimal acceptable system at minimal total installed cost.

Work Performed By: Naval Ship Engineering center Code 6176, Naval Research Laboratory, Naval Ordnance Systems Command, Naval Weapons Center, China Lake; Naval Warfare Lab, Dahlgren, Virginia; Tasker Industries, Los Angeles, California; and various contractors.

Program Accomplishments and Future Program:

Hardware development for second generation, more effective [deleted].

Fiscal year 1972 Program: Completed development and satisfactory test of the [deleted] DECM (SLQ–17).

Fiscal year 1973 Program: [Deleted.] Initiate use of the EW effective evaluation and develop module changes as indicated by its use. Initiate engineering development of the Threat Detector, Shipboard Tactical Reconnaissance System and Low Cost EW suites. [Deleted.]

Program to Completion: Continue decoy developments which will result in increased effectiveness against future threats [deleted]. Continue to develop and exercise [deleted] for the purpose of evaluating existing countermeasures equipment and tactics, as well as providing guidance to future EW development programs in order to insure their responsiveness to the contemporary threats. Complete and test the Ships Tactical Reconnaissance System, Threat Detector and Low Cost EW Suite. Initiate new, specific engineering development in EW as indicated by the state-of-the-art. [Deleted.]

Resources (in thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, $4,600; fiscal year 1972, [deleted]; fiscal year 1973, [deleted]; additional funds to completion are continuing; and the total estimated cost is not available.

SURFACE ELECTRONIC WARFARE

Chairman ELLENDER. Please provide a tabulation listing the projects to be funded, the amounts for each for fiscal year 1973.

Dr. FROSCH. Certainly.

(The information follows:)

[In thousands of dollars]

Project	Fiscal year— 1971	1972	1973
Low cost EW suite			
J-band jam and deception	750		
Shipboard EW quick reaction capability	1,212		
Tactical EW deception system	800	[Deleted]	
Antiship missile simulator threat detector	900		
Ship tactical reconnaissance system			
Beach jumper integration system	938		

Chairman ELLENDER. Are you requesting funds for any projects which have not been funded in prior years? If so, please comment on them.

Dr. FROSCH. Yes, sir. Three projects from this program element are new starts in fiscal year 1973. They are: (1) low-cost EW suite; (2) threat detector; and (3) ship tactical reconnaissance system. Low-cost EW recognizes a requirement for threat reactive EW on small combatant ships. The threat detector will provide small ships and amphibious ships with the most cost effective target warning and designa-

tor response to the antiship missiles threat. The project ship's tactical reconnaissance system will integrate a multisensor subsystem which will collect and disseminate multisensor tactical intelligence data.

Chairman ELLENDER. Please comment on the project entitled "Ship electronic warfare quick reaction capability" for which you are requesting [deleted].

Dr. FROSCH. This program's objective is to improve the defensive EW posture of the fleet as new intelligence data and/or situation dictate. Development under this project includes those efforts which result from a need for immediate response to threat capability.

Senator YOUNG. What will you do with the [deleted] you are requesting for tactical electronic warfare deception system?"

Dr. FROSCH. The 1973 planned program starts development of [deleted] devices, continues with decoy utilization and placement study and limits procurement of [deleted].

Chairman ELLENDER. Please comment on your request for funds for the project entitled "Beach jumper integrated system."

Dr. FROSCH. This project is intended to provide equipments [deleted].

Senator YOUNG. Why do you need the [deleted] you are requesting for antishipping missile threat simulation?

Dr. FROSCH. This program is an expansion of a project which simulated in hardware form one of the early missiles [deleted]. This small project was intensely successful in that it revealed areas where our technological or operational response was deficient, and provided an excellent method of providing real R.D.T. & E. test support for developing sensor and electronic countermeasures systems. This project has been so valuable that it has been expanded to include additional simulator development, both in flyable simulation hardware and in laboratory equipments which allow significant tests of a similar nature during the initiation or during early engineering of our shipboard electronic warfare equipment projects.

Chairman ELLENDER. Why do you need the increase of [deleted] you are requesting for fiscal year 1973 for surface electronic warfare?

Dr. FROSCH. This increase reflects basically two new projects being initiated in surface electronic warfare, the threat detector and the low-cost electronic warfare suite, and an increase in the scope and costs of our tactical electronic warfare decoy effort. The threat detector addresses an effort to provide an improved detection of antiship missiles by our auxiliary ships, oilers, replenishment ships, and force support ships. The ships currently possess limited radar and limited defensive equipments. The radars involve mostly those involved with ship navigation and sea/station keeping. The purpose of the threat detector project is to allow limited integration of these equipments to allow these ships to have a limited ASM defense capability.

The increase in the decoy project represents engineering development support required for several concepts developed during fiscal year 1971 and fiscal year 1972. This will allow sufficient funding to build engineering models of these decoys for effectiveness testing in order to evaluate potential procurement objects.

I have already described the lost-cost EW suite.

Surface Electronics

Chairman Ellender. $2.2 million is requested for the continuation of the engineering development program entitled "Surface electronics." I note that this entire amount is for the project "SPS radar improvements program." Can you give us a brief, unclassified description of this project and tell us its current status?

Dr. Frosch. Yes, sir; this project was initiated as part of an improvement program in fleet antiair warfare (AAW) readiness. It provides for technological improvements and modernization in shipboard air search radars which, when completed, will advance ship performance in an AAW environment. Major modifications to the AN/SPS–48 radar will be tested at sea during fiscal year 1973.

Chairman Ellender. Why do you need the $400,000 you are requesting for fiscal year 1973?

Dr. Frosch. The $400,000 difference between fiscal year 1972 and 1973 is necessary in order to integrate new improvements in other search radars other than AN/SPS–48. The radars under consideration will also favorably impact on fleet AAW readiness.

Acoustic Communications

Chairman Ellender. Of the total requested for ships, small craft, and related equipment, $9.3 million is for the program entitled "Submarines (engineering)—Acoustic communications." Would you give us a brief, unclassified description of this program, and tell us why you need the increase of $1.3 million you are requesting for fiscal year 1973.

Dr. Frosch. The program entitled "Acoustic communications" is made up of two distinct parts. The advanced acoustic communications system is centered primarily on the Azores fixed acoustic range. This is an eight NATO nation effort to produce an optimum communication system design to make fullest use of the ocean acoustic channel. The second part is the integrated acoustic communications system. This system is capitalizing on state-of-the-art knowledge and modifications to commercial hardware to give us an early, though limited capability in the fleet. Air, surface, and submarine platforms are included and initial sea tests have been most gratifying. The modified commercial hardware will be replaced by militarized hardware through a field change program. The heart of the system is computer controlled, and final programs for the computer program will result from the advanced communications system.

The increase of $1.3 million is required for increased effort in developing militarized hardware to speed up the field change program, thereby giving the fleet its interim capability earlier and for test and evaluation (developmental and tactical) during this phase.

Submarine Tactical Warfare Systems

Chairman Ellender. [Deleted] is requested for the continuation of the engineering development program entitled "Submarine tactical warfare systems (engineering)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

SUBMARINE TACTICAL WARFARE SYSTEMS (ENGINEERING)

Description.—The projects in this element are Submarine Integrated Attack Center (S1315), Submarine Sonar Improvements (S23X3) and Submarine Acoustic Warfare Systems (SAWS) (S2334). The Submarine Integrated Attack Center entails the development, test and evaluation of an integrated combat system for the mid 70's SSN. This project will integrate the various functions, displays and data produced by the subsystems (electromagnetic and acoustic sensors, fire control, weapons, launchers, countermeasures and command and control) to yield the optimum capability and reliability in support of command and control functions. Submarine Sonar Improvements will provide state of the art improvements to SSN sonar systems, [deleted] and Digital Transmission System. SAWS will provide submarines with improved capability to avoid detection, [deleted]. Equipments being developed include [deleted] receiver (AN/WLR–9) (Service approved) threat classification and evaluation unit, semi-automatic countermeasures launcher, and [deleted] torpedo countermeasure.

Work performed by:

a. *Sub Integrated Attack Center (S1315):* Navy Underwater System Center, New London; Naval Undersea Research and Development Center, San Diego; Naval Electronic Laboratory Center, San Diego; Naval Ordnance Laboratory, Washington, D.C.; Naval Ships Engineering Command; Naval Ships Systems Command, Naval Air Systems Command, and Naval Electronics Systems Command.

b. *Sub Sonar Improvements (S23X3):* Navy Underwater System Center, New London; Navy Undersea Research and Development Center, San Diego; International Business Machines Corporation; Oswego, N.Y.; Hughes Aircraft Company, Fullerton, Calif.

c. *Sub Acoustic Warfare Systems (S2334):* Naval Underwater Systems Center, New London; Naval Ship Research and Development, Panama City, Florida, and Carderock, Md.; Naval Undersea Weapon Center, San Diego; Bendix Pacific Corporation, N. Hollywood, Calif.; Aero-Jet General Corp., Azusa, Calif.; Raytheon Company, Portsmouth, Rhode Island; Dynell Electronics Corporation, Melville, New York; Sperry Gyroscope Company, Great Neck, New York; Columbia Research, Gaithersburg, Md.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 Programs:

a. *Sub Integrated Attack Center (S1315):* This project is a new start in FY 1972. The definition of the Submarine Integrated Attack Center will be completed and a combat system specification will be issued. Initial efforts are directed toward an all digital fire control in the Submarine Attack Center for improved/flexible (through software changes) target motion analysis. saved space and improved reliability/maintainability.

b. *Sub Sonar Improvements (S23X3):* None.

c. *Sub Acoustic Warfare System (S2334):* Service approval obtained, production contract awarded for [deleted.] Receiver (AN/WLR–9) with delivery commencing [deleted.] Complete design of SAWS, commence fabrication and test models of Engineering Development Models (EDM's). Complete test of [deleted] (ETC–1) and select production contractor. Complete design requirements for [deleted.]

FY 1973 Planned Program:

a. *Sub Integrated Attack Center (S1315):* Engineering development of the all digital attack center fire control equipment (ADAC) will commence. Testing of candidate displays will be completed and determination of best overall combat system configuration will be made. The existing candidate displays are the MK–81 digital target motion analyzer of the MK 113 fire control system and the multifunction console of the AN/BQS–13 [deleted] sonar system. This effort is applicable to follow on SSN classes and retrofit to present first line SSN's.

Sub Sonar Improvements (S23X3): This project is a new start in FY 73. Integrate the [deleted] with the AN/BQS–13 (DNA) [deleted] sonar system. Conduct interface feasibility study and engineering development for AN/BQS–13 (DNA) [deleted] Performance Monitoring/Fault Location system including preparing software, tests and procurements of special test equipments.

c. *Sub Acoustic Warfare System (S2334):* Receive first Sub Acoustic Warfare System (SAWS) unit and conduct technical and operational evaluation. Fabricate

and test Engineering Development Model (EDM) and [deleted] (MSS). Award production contract of [deleted] (ETC–1).

Program to Completion:

a. *Sub Integrated Attack Center (S1315):* Full scale engineering development, will be conducted leading to a fully operational capability when the Mid–70's SSN goes to sea in the late 1970's.

b. *Sub Sonar Improvements (S23X3):* Complete test and evaluation of integrated AN/BQS–13 DNA [deleted.] Pursue other improvements such as Digital Transmission System depending on new operational requirements priorities which are currently under study.

c. *Sub Acoustic Warfare System (S2334):* Complete evaluation of [deleted] (MSS) and award production contract for SAWS.

RESOURCES

[In thousands of dollars]

	Fiscal year—			Additional to completion	Total estimated cost
	1971 and prior	1972	1973		
R.D.T. & EN. funds	[1] 37,819	[deleted]	[deleted]	Continuing	Not available.
Man years	211	188	188	Not available	Do.

[1] Includes funding for S2332, BQS–13 DNA Sonar, which is budgeted in 24311N in fiscal year 1973.

SUBMARINE TACTICAL WARFARE SYSTEM

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. I would be happy to.

(The information follows:)

	Fiscal year—		
	1971	1972	1973 request
Sub integrated attack center			[Deleted]
Sub sonar improvement		[Deleted]	
Sub acoustic warfare system	4,298		

Chairman ELLENDER. Are you requesting funds for any projects not funded in prior fiscal years? If so, please comment on theim.

Dr. FROSCH. There are two new projects for fiscal year 1973. The "Submarine Integrated Attack Center" project provides for the development, test and evaluation of an integrated combat system for the next generation SSN and possible retrofit to current first line SSN's. Engineering development of an all digital attack center fire control equipment and testing of candidate displays will highlight fiscal year 1973 efforts.

The "Submarine Sonar Improvement" project will provide state of the art improvements to SSN sonar system, including a [deleted] Transmission System. Fiscal year 1973 efforts will include integration of the [deleted] and commence engineering devleopment for the AN/BQQ–5 Performance Monitoring/Fault Location system.

Senator YOUNG. Please comment on the funds you are requesting for the project entitled "Submarine Acoustic Warfare System" and tell us when you expect this system to be operational.

Dr. FROSCH. The funds requested for "Submarine Acousic Warfare System" will support the technical and operational evaluation of the first semiautomatic launcher system and build and test the first engineering development model of the [deleted]. The [deleted] receiver, AN/WLR–9 developed under this project became operational in late fiscal year 1971. The remaining devices/systems in this project will become operational [deleted].

SUBMARINE SURVEILLANCE EQUIPMENT PROGRAM

Chairman ELLENDER. [Deleted] is requested for the engineering development program entitled "Submarine surveillance equipment program (engineering)." Has the committee been provided with details on this program?

Dr. FROSCH. Yes, it has.

ORDNANCE, COMBAT VEHICLES, AND RELATED EQUIPMENT

Chairman ELLENDER. The next budget activity to be considered is "Ordnance, combat vehicles, and related equipment" for which you are requesting $44.8 million. How much was provided for this budget activity in fiscal years 1971 and 1972?

Dr. FROSCH. A total of $64.3 million was provided for this budget activity in fiscal year 1971, and the fiscal year 1972 estimate is $60 million.

CAPTOR MINE

Chairman ELLENDER. The next request is $19.4 million for the continuation of the development of the Captor [deleted] mine. Selected paragraphs from the description summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

CAPTOR

Background.—Improvement in submarine operating characteristics can be expected through 1970's including reduced radiated noise levels, increased speed capabilities and operating depths. With retirement of older diesel powered units and replacement nuclear units [deleted]. Lethal volume surrounding present [deleted] Captor will augment and provide additional capability to conventional air, surface, and submarine ASW forces in combating modern submarines and eliminate many deficiencies in present ASW mines. Exploratory development of Captor (Encapsulated Torpedo) initiated 1 July 1960 and completed 30 June 1965. With approval of Mine Advisory Committee and Presidential Scientific Advisory Committee April 1965 and October 1965 respectively, advanced development began 1 July 1965. On 26 August 1970 Chief of Naval Operations approved accelerated development of Captor. [deleted] later changed to [deleted].

Description.—Captor is [deleted] mine, which launches Torpedo MK–46 against submerged submarines [deleted].

Work performed by.—Naval Ordnance Laboratory, White Oak; Applied Research Laboratory, University of Texas; Marine Science Center, Honeywell Corporation, Seattle, Washington. A major systems contract for industrial assistance is expected to be signed in March 1972.

Program accomplishments and future programs:

Fiscal year 1972 program.—Engineering development design effort continued. Testing of sub-system continued. Procurement initiated for fabrication of prototype CAPTOR. Award of major development engineering contract is planned. Development Concept Paper (DCP) approved 6 Dec 71. Commenced Engineering Development. Award Development Contract for industrial assistance.

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Fiscal year 1973 planned program.—Continuation of development engineering and design contract. [Deleted.]

Resources (in thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, 11,000; fiscal year 1972 [deleted]; fiscal year 1973, [deleted]; additional to completion [deleted]; total estimated cost [deleted].

CAPTOR MINE

Chairman ELLENDER. Just what is the objective of this effort?

Dr. FROSCH. The objective of the CAPTOR program is to develop a [deleted] mine which utilizes a MK–46 torpedo as its destruct vehicle for use against enemy submarines [deleted].

Senator YOUNG. What is the current status of this development program?

Dr. FROSCH. The CAPTOR program is now in engineering development. By March 17 of this year we expect to award a major development contract to one of four competing industrial contractors. The Naval Ordnance Laboratory is conducting tests of the individual subsystems. These tests include various types of submarine runs at the NOL test facility at Ft. Lauderdale, Fla., [deleted].

Chairman ELLENDER. Tell us exactly what you plan to do with the [deleted] million you are requesting for fiscal year 1973.

Dr. FROSCH. I will be glad to do so for the record.

(The information follows:)

We anticipate expending R.D.T. & E. funds in the following manner:

Naval Ordnance Laboratory [deleted]. Technical guidance and management of the program.

Naval Undersea Research and [deleted] Development Center. Modifications to the MK 46 torpedo for CAPTOR usage.

Naval Mine Engineering Facility [deleted], Yorktown, Va. Development of Integrated Logistic Support Plans.

Naval Coastal Systems Laboratory, [deleted] Panama City, Fla. Testing and analysis of counter-measure features.

Naval Torpedo Station [deleted], Keyport, Wash. Testing of MK 46 torpedo for CAPTOR use.

Other naval activities to support NOL/White Oak [deleted].

Major development contractor [deleted].

Other contractors to furnish subsystems [deleted]. Equipment to NOL.

MK–48 TORPEDO

Chairman ELLENDER. The request includes $7,044,000 for the continuation of the MK–48 torpedo research and development program. Selected paragraph from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Background.—MK–46 Torpedo Project originated from urgent need to develop a torpedo which could cope with modern high performance nuclear powered submarines expected to be available to Soviet Navy in 1970's. Present fleet inventory of non-nuclear submarine launched Anti-Submarine Warfare (ASW) weapons are not capable [deleted] to deal with threat.

MK–46 Torpedo Weapon System program evolved from Research Torpedo Configuration Program (RETORC) and resulted in MK–48 Torpedo as first Navy program (1963) to undergo project definition. Project definition phase resulted in award of fixed price development contract with *Westinghouse Corporation* for single-purpose ASW torpedo in June 1964 and in initiation of back-up homing system development with *Clevite Corporation* in December 1964. Because of degree of technical difficulty inherent in attaining required performance it

became necessary to expand this program development to include a back-up propulsion system, a complete test vehicle and, coincident with decision that MK–48 Torpedo introduced to fleet be dual-purpose, ASW/Anti-Surface Ship weapon, a competing Mod 1 Torpedo development program under cost-plus contract with Clevite in August 1967. This development included a larger (than Mod 0) Anti-Ship/ASW warhead, made possible by a more efficient engine and a magnetic "stand-off" sensor.

Dual-purpose decision also resulted in evolution of Westinghouse Mod 0 (ASW) design to Mod 2 (ASW/Anti-Ship) [deleted].

Dual-purpose decision also necessitated further modification of previously developed and partially installed (ASW only) modifications to submarine fire control systems to permit issuing Anti-Surface Ship orders to torpedoes.

In 1968, production effort began on both Westinghouse Production Prototype (PPT) and Clevite Development Prototype (DPT). Later that year in-water testing of torpedoes commenced. Results of testing programs caused further design changes in an iterative fashion leading to design configuration of both torpedoes for the limited pilot production and competition in comparative Selection Test Program during 1970. This culminated with selection of Mod 1 torpedo for on-going production in July 1971.

Also designed and built under Westinghouse Development Contract were MK–27 Torpedo Targets to test both torpedoes in the Selection Test Program. Problems in evolution of torpedo design were accompanied by similar problems in target since the two had to remain compatible. The evolved target design is operationally acceptable and very reliable.

Description.—MK–48 Mod 1 Torpedo provides a weapon meeting an urgent fleet requirement for long range, high performance conventional warhead torpedo possessing high kill capability against high speed, deep diving enemy nuclear submarines in presence or absence of torpedo countermeasures. MK–48 Mod 1 also has secondary anti-ship capability and can be fired and wire-guided from submarine as well as surface ship large torpedo tubes when existing Fire Control Systems have been modified for MK–48 compatibility. MK–48 Mod 1 will replace current MK–37 ASW torpedo, WW II vintage MK–14 torpedo and almost as old MK–16 torpedo in anti-ship role.

MK–48 Mod 1 torpedo is 21 inches in diameter, 19.2 feet long, weighs 3,600 pounds, capable of speeds to [deleted] knots, [deleted] depths to [deleted] feet, endurance [deleted] an explosive payload equivalent to [deleted] a homing (active and passive) acquisition range of over [deleted] yards against specified targets, a wire command control capability of [deleted] and most advanced state-of-the-art design and circuitry for improved performance [deleted].

Related activities.—None.

Work performed by.—Prime Contractor: *Torpedo:* Gould, Inc., Clevite Ocean System Division, Cleveland, Ohio; *Exploder Development:* General Motors Corporation, AC Electronic Division, Milwaukee, Wisconsin; Principal Subcontractor: *Torpedo:* IBM, Oswego, N.Y.

Program accomplishments and future programs:

Fiscal year 1971 and prior accomplishments.—Initially all effort under Submarine Launched Anti-Ship Torpedo and Torpedo Countermeasure Resistance Programs. [Deleted] FY 1968, a MK–48 Mod 1 Program established when [deleted] and Torpedo Test Vehicle contracts merged into a development program for a complete torpedo. A development contract was negotiated for a program start in April 1968.

Fiscal year 1972 program.— 1 July 1971 decision made to procure Mod 1 torpedo for production and inventory and terminate Mod 2 program. Selected torpedo will undergo additional technical and operational evaluation, concurrently developing tactical doctrine for fleet employment, and validating fleet procedures. Additional testing expected to complete March 1972. Deliveries of pilot production torpedoes (October 1970 procurement) commenced June 1971, permitting initial fleet introduction [February 1972] upon completion of in-water acceptance tests by Navy.

Fiscal year 1973 planned program.—With MK–48 Mod 1 Torpedo in production stage, orderly transition out of research and development leaves significant tasks to be accomplished.

[Deleted.]

b. Warhead exploder sensor—improve influence exploder sensor for better target localization and increased stand-off distance. Effort will complete by end FY 1973.

c. Acoustic and homing improvement—modify re-attack logic to enhance countermeasures resistance and increase hit probability. Anticipate greatest portion this effort will complete FY 1973.

d. Operational support development—develop acoustic sonar ray-path plotter to aid in selection of optimum torpedo settings to maximize target acquisition. This support area includes other total system requirements (other than torpedo) such as Fire Control, launcher, etc. Much of this effort complete by end FY 1973.

Work described above can not be deferred as execution in given time frame necessary to improve torpedo base line configuration prior to next torpedo buy schedule FY 1974 to avoid costly and disruptive backfit requirements.

Program to completion.—Radiated noise reduction, design improvement, in-service engineering and Weapon System Effectiveness Optimization in Navy Laboratories will be major efforts.

Resources (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971 and prior, 295,800; fiscal year 1972, 17,126; fiscal year 1973, 7,044; additional funds to completion are 5,785; and the total estimated cost is 325,755.

MK–48 Torpedo

Chairman Ellender. What are the objectives of your planned 1973 program for the MK–48?

Dr. Frosch. The objectives of the 1973 program are: [deleted] improve the warhead exploder sensor for increased standoff distance and improved target localization, improve homing logic and provide increased vertical search coverage, and complete the operational evaluation of workshop test and handling equipment.

Chairman Ellender. I think we have discussed this program in detail both earlier in our discussion of R. & D. and in considerable detail in the request in the "Other procurement" appropriation for the procurement of these torpedoes. Dr. Frosch, are you convinced that the Navy is justified in going ahead with the procurement of this torpedo?

Dr. Frosch. Yes, sir; I am. We completed the formal operational evaluation on April 18, 1972. [Deleted.] We are quite pleased with the torpedo performance, particularly in that some of the nonsuccessful runs were intentionally designed to determine performance limits and were thereby biased against 100 percent success. Production in quantities of the MK–48 torpedo will fill a void in our arsenal of weapons for use against modern nuclear-powered submarines and surface units.

Landing Force Assault Amphibian Vehicle

Chairman Ellender. $400,000 is for the project entitled "Marine Corps Weaponry (Operational Systems)—Landing Force Assault Amphibian Vehicle." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Marine Corps Weaponry (Operational Systems)

Category: Operational Systems Development

Budget Activity: 6-Ordnance, Combat Vehicles and Related Equipment

DESCRIPTION: This Program Element provides RDT&E funds for the operational systems development of all Marine Corps ordnance items and combat vehicles. Currently, only one project appears, 4703, Landing Force Assault Amphibian Vehicles. This project provides for continuous improvements in the performance profile of the LVTP7 family of assault amphibian vehicles. Marine Corps experience with the LVTP5A1 family since 1955 has demonstrated the value of maintaining a continuing product improvement development capability. Accordingly, this project is predicated upon the successful utilization of such a capability to enhance the ten year life cycle of the LVTP7 subsequent to its introduction in FY 1972. This project will provide a continuing RDT&E effort to improve the subsystems and components of the LVTP7 family of vehicles. Included in the effort will be the monitoring, development and evaluation of technological advances in systems and subsystems so that significant improvements over current performance parameters may be exploited. Components to be considered include, weapons, weapons stations, power packages, transmissions, energy and power conversion devices, track and track suspension systems, and water propulsion systems. This effort will continue throughout the life cycle of the vehicle and is designed to ensure reasonable exploitation of state-of-the-art advances.

WORK PERFORMED BY: The prime contractor for this project is the FMC Corporation, Ordnance Division, 1105 Coleman Avenue, San Jose, Calif. Work performed by FMC in support of this project is managed and directed by the Naval Ship Systems Command (PMS 300), Washington, D. C.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program: Efforts will continue on several tasks cited during FY 1971. In addition, the detailed design and/or evaluation of prototype components which will improve the overall performance of the LVTP7 family will be instituted, including redesign efforts, as necessary. Development of an improved engine for the LVTP7, product improved line charges and hardware related to the .50 caliber weapons station, will be monitored and tested. Documentation for further development, production and provisioning will be generated, and technical data (procurement package) prepared, as required. During FY 1972 and previous years this project was funded under Program Element 63660M, Marine Corps Weaponry (Advanced) as Amphibious Vehicle Subsystems Componentry.

FY 1973 Planned Program: General engineering tasks, technical support and related Engineering Development efforts will continue under this program element (26620M) in FY 1973 in the areas of increased speed, increased mobility, reduced maintenance, increased armor protection, improved firepower, increased safety and lower costs in order to improve the performance profile of the family of vehicles.

Program to Completion: This Program Element is a continuing one. Additional projects may be added in the future. Meanwhile, development efforts related to the Landing Force Assault Amphibian Vehicles will continue in all areas cited previously in order to insure that the state-of-the-art is maintained and that performance characteristics of the family are improved as required.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	500*	500*	400	Continuing	NA

*Shown under PE 63660M, project C1401.

LANDING FORCE ASSAULT AMPHIBIAN VEHICLE

Chairman ELLENDER. Would you describe your program for fiscal year 1973 and tell us what you plan to do with the funds requested?

General BROOKS. Yes, sir. General engineering tasks, technical support, and related engineering development efforts will continue in the areas of increased speed, increased mobility, reduced maintenance, increased armor protection, improved firepower, increased safety, and lower costs in order to improve the performance profile of the LVTP7 family of assault amphibian vehicles.

ORDNANCE AND FUZING

Chairman ELLENDER. $5.2 million is requested for the program entitled "Ordnance and Fuzing." Would you give us a brief, unclassified description of this program?

Dr. FROSCH. I will be glad to do so. This program was established to provide modern guns, advanced and improved conventional fuzes and ammunition to the fleet utilizing the latest state-of-the-art.

Senator YOUNG. Of the total requested for Ordnance and Fuzing, $2.2 million is for the project entitled "high fragmentation projectile." Please comment on this project, and tell us what you plan to do with the $2.2 million you have requested for fiscal year 1973.

Dr. FROSCH. This project will provide a conventional projectile with all aspects of its performance improved with little increase in production costs over the present family of projectiles. During the fiscal year most of the funds will be spent on fabrication of test projectiles which will be subjected to extensive testing.

Chairman ELLENDER. $2.9 million is for a classified project. Has the committee been furnished with complete details on this project?

Dr. FROSCH. Yes, sir. The classified details of this project have been provided.

Chairman ELLENDER. Why do you need the increase of $822,000 for ordnance and fuzing which you are requesting for fiscal year 1973?

Dr. FROSCH. The fiscal year 1973 increase is for the better part attributed to the classified project with the hi-fragmentation projectile and major caliber projectile projects reflecting moderate increases.

MINE DEVELOPMENT

Chairman ELLENDER. Of the total requested, $3.1 million is for the advanced development program entitled "mine development." Could you give us a brief, general, unclassified description of this program?

Dr. FROSCH. Yes, sir. The program encompasses two individual projects.

(*a*) Destructors MK 41/42 are a new family of mines which will feature maximum aircraft compatibility, minimum maintenance, test and assembly time and high reliability.

(*b*) Reco is a classified project which when incorporated in the mine will enhance the operational usage of mines now in advanced or engineering development and those in the planning stage of development.

MINE COUNTERMEASURES

Chairman ELLENDER. $3.1 million is requested for the program entitled "Mine countermeasures (advanced)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

MINE COUNTERMEASURES (ADVANCED)

Description.—This element supports three projects.

a. Explosive Ordnance Disposal Equipment U4734. This project covers advanced development of equipment to provide the Explosive Ordnance Disposal (EOD) forces the capability to reduce or neutralize hazards existing in explosive ordnance which, present a threat to operations, installations personnel or material. Thirty two separate equipment items will be developed to accomplish the following functions: detect and locate, gain access and identify, render safe, recover, remove and dispose, mission support.

b. Inland Waterways Mine Countermeasure System. An integrated Mine Countermeasures System consisting of vehicles and equipments specifically designed to counter small river mines in the riverine environment and for special purpose equipment to counter Destructor type weapons in land and in shallow water. The system will consist of integrated components including vehicles (s); minehunting, neutralization and minesweeping gear, specifically designed to effectively counter command, contact, or influence fired mines in the narrow, shallow confines of rivers and their tributaries. This integrated system will supplement the various emergency developed "quick fix" pieces of equipment for countering mines pleated in the riverine environment.

c. Advanced Airborne Mine Countermeasures Equipment, W2612. Equipment specifically designed to be operated from the RH–53 mine countermeasure configured helicopter will include a 30 knot speed magnetic influence sweep with a power source capable of generating [deleted] current, countermeasures and surveillance device for use against mines employing a new mine mechanism, equipment for measuring magnetic environmental parameters to assist in determining track spacing and effectiveness of the sweep, fresh/salt water and overland sweep for magnetic influence mines, and an expendable rapid self-deployable moored sweep.

Work performed by:

a. Explosive Ordnance Disposal Equipment. The Naval Explosive Ordnance Disposal Facility, Indian Head, Maryland has been designated as the lead laboratory.

b. Inland Waterway Mine Countermeasure System. U.S. Naval Ship Research and Development Laboratory, Panama City, Florida, Naval Ship Engineering Command, Washington, D.C., Applied Research Laboratory, Austin, Texas.

c. Advanced Airborne Mine Countermeasure Equipment— U.S. Naval Ship Research and Development Laboratory, Panama City, Florida and the EDO Corporation, College Point, New York.

Program accomplishments and future programs:

Fiscal year 1972 program:

a. Explosive Ordnance Disposal Equipment. Complete operational evaluation of two items of equipment, commence operational evaluation of two items, complete advance development on three items and start advance development on 3 new items.

b. Inland Waterway Mine Countermeasure System. Effort will be directed to expanding the limited capability to counter mines in inland waterways which has been provided to the fleet as a result of the quick-fix efforts in FY 69, 70 and 71. Specfically, a system to neutralize mines that have been detected, classified and marked by the CMK 1 sonar will be developed. [Deleted.] This system will provide a mine classification, marking and neutralization capability [deleted] and will provide a countermeasure to the small pressure mines now being used in Vietnam. Fleet testing of the "quick-fix" deep moored sweep will continue.

c. Advanced Airborne Mine Countermeasure System. Tests of prototype of power pack, using breadboard interconnecting wiring, for Hi-Performance system will be completed and results fed into final specifications. Sweep tail to be used in Hi-Performance system is now used by MSO sweepers and sweep tail testing at airborne speeds will be conducted.

Fiscal year 1973 planning program:

a. Explosive Ordnance Disposal Equipment. Operational evaluations are scheduled to be completed on five items and to begin on two items. Advanced development will be completed on two items and commence on four new items.

b. Inland Waterway Mine Countermeasure System. Hardware design and fabrication begun in FY 72 on the mine classification and neutralization system will be completed. Tactical doctrine for its use will be developed and the system will be evaluated.

c. Advanced Airborne Mine Countermeasures System. Final engineering design required for detailed drawings to be used in manufacture of magnetic sweep will be completed, including structural design of floats, nacelle and tow boom. Fabrication and integration of first high-performance magnetic minesweeping system will be started.

Program to completion:

a. Explosive Ordnance Disposal equipment. Development, Operational testing and introduction to the Fleet will be completed by [deleted].

b. Inland Waterway Mine Countermeasure System. [Deleted].

c. Advanced Airborne Mine Countermeasure System. [Deleted.]

Resources (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, 942; fiscal year 1972, 3,414; fiscal year 1973, 3,107. Additional funds to completion are continuing; and the total estimated cost is not available.

MINE COUNTERMEASURES

Chairman ELLENDER. Of the $3.1 million requested, $2.1 million is for the continued advanced development of advanced airborne mine countermeasures equipment. Has the committee been provided with complete details on your planned program for fiscal year 1973 for this project?

Dr. FROSCH. Yes, sir; this information has been provided.

Chairman ELLENDER. Please tell us what you will do with the $415,000 you are requesting for inland waterway mine countermeasures.

Dr. FROSCH. Fiscal year 1973 effort will concentrate on the development of the mine classification and neutralization systems. [Deleted.]

Senator YOUNG. $612,000 is requested for explosive ordnance disposal equipment. Comment on this request.

Dr. FROSCH. Operational evaluations are scheduled to be conducted on the following items of explosive ordnance disposal equipment: propellant powered remote opening device, explosive analysis kit, underwater and surface firing delay device, incendiary torch remote opening device, blast fragmentation suppression protective curtain, and radiographic equipment. Advanced development work will be completed on the portable steam generator and the portable hand extensions. Advanced development will commence on the liquid jet perforator, preformed curvilinear shaped charges, nonconductive, nonmagnetic handtools, and a portable blast supression system.

MARINE CORPS WEAPONRY

Chairman ELLENDER. $1.3 million is requested for the program entitled "Marine Corps weaponry (advanced)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

Title: *Marine Corps Weaponry (Advanced)*

Description.—This Program Element provides RDT&E funds for the advanced development of all Marine Corps ordnance items and combat vehicles. In FY 1973, the following four projects are included in this Program Element:

a. [Deleted.]

b. *Tactical Motor Transport Vehicles (Advanced), 4101*—This program will provide for the continuing advanced development of components and systems

which will significantly increase the capability and maintainability of tactical motor transport equipment.

c. *Ammunition for XM202, 4701*—The objective of this project is to develop a variety of projectiles (smoke, heat, [deleted] flame and fragmentation) for use in the XM202 launcher. The diverse family of warheads will result in a multipurpose, lightweight, multishot assault weapon.

d. *Encapsulated Flame Round Program, 4702*—The end product of this effort will be a round of ammunition in which the flame agent is encapsulated, thus providing a more efficient means of delivery of the agent over current rod-type systems, plus the added advantages of increased range of delivery and elimination of battleship flame signature.

Work performed by.—Texas Instruments, Dallas, Texas, has contracted for guidance packages and control components related to the [deleted] Ordnance project. Work under Tactical Motor Transport Vehicles is administered by the U.S. Army Tank—Automotive Command, Warren, Michigan. U.S. Army Missile Command (MICOM) and the U.S. Army Munitions Command perform the tasks under Ammunition for the XM202. The U.S. Army Munitions Command also provides technical direction for the Encapsulated Flame Round Program.

Program accomplishments and future programs:

Fiscal year 1972 program:

a. *Laser Homing Ordnance.*—Seeker and guidance components will be redesigned/repackaged for minimum weight and volume of the pursuit guidance system. Redesign of the control section to eliminate an undesired shroud will be initiated. Critical experiments will be conducted to establish a baseline propulsion package. Wind tunnel testing and component firings will be followed by system integration.

b. *Tactical Motor Transport Vehicles (Advanced).*—Prior year tasks will continue with additional work being directed toward the development of a vehicle emission control system to meet new vehicle emission standards.

c. *Ammunition for XM202.*—The fabrication of test rounds for feasibility demonstrations will be initiated.

d. *Encapsulated Flame Round Program.*—Exploratory Development efforts will continue with added emphasis being placed on target response studies. Marine Corps funds will be used to investigate ramifications associated with an encapsulated round smaller (90mm and 105mm) than the 152mm.

FY 1973 Planned Program:

a. [Deleted.] Testing and evaluation programs begun in FY 1972 will continue to completion. Also, the design of the last segment of the program, a [deleted] will be completed.

b. *Tactical Motor Transport Vehicles (Advanced).*—Test and evaluation of components and systems to determine the operational suitability of articles to expand the performance parameters of tactical motor transport equipment will continue with emphasis on automotive componentry.

c. *Ammunition for XM202.*—Advanced development and the testing of various warhead designs will continue. Feasibility demonstrations of all warhead concepts will be conducted to provide guidance for future program decisions.

d. *Encapsulated Flame Round Program.*—This program will enter full-scale advanced development. Prototype rounds will be procured and tested. Marine Corps funds will continue to keep developers interested in rounds other than the 152mm alone.

Program to Completion: This is a continuing Program Element; therefore, only the FY 1973 projects will be addressed:

a. [Deleted] *Ordnance.*—The emphasis in this program will be on a control system that can be used with any [deleted] system and different diameter projectiles. Interchangeable [deleted] systems will be developed so that the best [deleted] combination can be used. The current Initial Operational Capability (IOC) for [deleted].

b. *Tactical Motor Transport Vehicles (Advanced).*—This project is characterized by short research and/or development cycles an d will continually pursue tasks in the areas described above. Consequently, no milestones can be specified.

c. *Ammunition for XM202.*—By the end of FY 1973, effectiveness and feasibility will have been established. Subsequent efforts will be contingent upon performance of the additional warheads, cost estimates and U.S. Army interest in a joint project.

d. *Encapsulated Flame Round Program.*—Advanced Development will continue during FY 1974. In FY 1975 the program will enter Engineering Development. Service tests are scheduled for FY 1977.

Resources (in thousands of dollars):
R.D.T. & E.N. funds for fiscal year 1971, 1,070; fiscal year 1972, 2,155; fiscal year 1973, 1,250; additional funds to completion are continuing; and the total estimated cost is not available.

Marine Corps Weaponry

Chairman Ellender. Please provide a tabulation listing each of the projects to be funded, the amounts for each for fiscal years 1971 and 1972 and the request for fiscal year 1973.

General Brooks. I will be glad to do so.

(The information follows:)

MARINE CORPS WEAPONRY (ADVANCED)

[In thousands of dollars]

	Fiscal year—		
	1971 actual	1972 estimate	1973 estimate
C1201—Light assault/antitank weapon (LAAW)		955	
C1202—[Deleted] ordnance		200	500
C1204—Multishot portable assault weapon (MPAW)		100	
C1401—Amphibious vehicle subsystems/componentry	500	500	
C4101—Tactical motor transport vehicles	71		150
C4701—Ammunition for XM-202 multishot portable flame weapon system launcher	499	400	400
C4702—Encapsulated flame round program			200
Total	1,070	2,155	1,250

Chairman Ellender. Please comment on your request for $500,000 for [deleted] Ordnance.

General Brooks. A requirement exists to increase the effectiveness of indirect fire weapons against both moving and stationary targets on the battlefield. Tests with terminally guided ordnance have demonstrated conclusively that a quantum increase is attainable through this approach. While control and guidance systems have been developed for missiles and bombs, guided projectiles for indirect fire weapons have not been fielded. This joint U.S. Navy/U.S. Marine Corps project will develop a guidance and control system for cannon-launched projectiles [deleted]. The $500,000 requested for fiscal year 1973 will be used to complete testing and evaluation programs begun in fiscal year 1972. Also, the design of the last segment of the program, [deleted], will be completed.

Senator Young. $150,000 is requested for tactical motor transport vehicles. Please comment on this request and tell us what you will do with the funds you are requesting.

General Brooks. A requirement exists to incorporate significant automotive improvements in vehicle systems and concepts to increase the performance envelope of tactical motor transport equipment. This program will provide for the continuing advanced development of components and systems which will increase the capability and maintainability of tactical motor transport equipment. The $150,000 requested for fiscal year 1973 will fund the test and evaluation of such components and systems to determine their operational suitability. Emphasis will be on automotive componentry.

Chairman ELLENDER. $400,000 is requested for ammunition for the XM202 multishot portable flame weapon system launcher. Please comment on this request.

General BROOKS. The objective of this project is to develop a variety of projectiles (smoke, heat, flame, and fragmentation) for use in the XM202 launcher. The diverse family of warheads will result in multipurpose, lightweight, multishot assault weapon. In fiscal year 1973, advanced development and the testing of various warhead designs will continue. Feasibility demonstrations of all warhead concepts will be conducted to provide guidance for future program decisions.

Chairman ELLENDER. Comment on your request for $200,000 for the encapsulated flame round program.

General BROOKS. The endproduct of the encapsulated flame round program will be a round of ammunition in which the flame agent is encapsulated, thus providing a more efficient means of delivery of the agent over current rod-type systems, plus the added advantages of increased range of delivery and elimination of battlefield flame signature. This program will enter full-scale advanced development in fiscal year 1973. Prototype rounds will be procured and tested. Marine Corps funds will continue to keep developers interested in rounds other than the 152mm alone.

Senator YOUNG. Where was this project funded in prior years?

General BROOKS. Under exploratory development.

ORDNANCE AND FUZING, ENGINEERING DEVELOPMENT

Chairman ELLENDER. $3.8 million is for an engineering development program entitled "ordnance and fuzing." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

ORDNANCE AND FUZING (ENG)

Description.—In providing for an improved gunfire capability, the Navy has been developing two weapon systems. The Major Caliber Lightweight Gun (MCLWG) is being developed as an 8-inch gun to provide improved surface and shore fire support up to [Deleted] with standard conventional projectiles. A new 5"/54 Lightweight Gun (LWG) MK 45 has recently completed development and has been service approved. Both of the new gun systems will employ the new MK 86 Gunfire Control System (GFCS) now under development. This GFCS will be capable of tracking [Deleted] surface targets with speeds [Deleted] also have an anti-aircraft (AA) capability and an [Deleted].

Work performed by: Naval Weapons Center, China Lake, California; Naval Weapons Laboratory, Dahlgren, Va.; Naval Ordnance Plant, Louisville, Kentucky; Watervliet Arsenal, Watervliet, New York; Naval Ordnance Laboratory, White Oak, Maryland; Northern Ordnance Division FMC Corporation, Minneapolis, Minnesota, Lockheed Electronic Company, Plainfield, New Jersey.

Program accomplishments and future program:

Fiscal year 1972 program:

Major Caliber Lightweight Gun—Conducted test firng to validate modification changes. Complete evaluation at Naval Weapons Lab (NWL) Dahlgren.

MK 86 GFCS—Completed Operational Evaluation (OPEVAL), accomplished indicated refinements/engineering changes. Terminate R&D phase.

MK 68 Improvement—Initiate effort to improve the operational performance of the MK 68 GFCS in its ability to counter the anti-ship missile threat.

Program to Completion:

Major Caliber Lightweight Gun—The gun and mount will be prepared to enter production in [deleted]. Ammunition development will be initiated in [deleted] and will be completed in [deleted].

MK 68 Improvement: Improvements to the MK 68 GFCS in the anti-ship missile defense role will be completed and the project will terminate in [deleted].

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, 4,628; fiscal year 1972, 7,552; fiscal year 1973, 3,775; additional funds to completion are continuing; and the total estimated cost is not available.

ORDNANCE AND FUZING

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

ORDNANCE AND FUZING

	1971	1972	1973
	Fiscal year—		
Major caliber lightweight gun	2,090	2,515	1,669
MK-68 gunfire control system improvements	498	538	1,471
Major caliber ammunition	0	0	635
Lightweight gun system	2,040	2,764	0

Senator YOUNG. Are you requesting funds for any projects which have not been funded in prior fiscal years? If so, please describe them.

Dr. FROSCH. The major caliber ammunition project is new in fiscal year 1973 and will provide improved long-range conventional ammunition for the 8-inch major caliber lightweight gun which has just completed initial operational testing.

Chairman ELLENDER. Of the total requested, $1.7 million is for the project entitled "Major Caliber Lightweight Gun." Please tell us what has been accomplished in this program to date, and what you hope to accomplish with the funds you are requesting for fiscal year 1973.

Dr. FROSCH. During fiscal year 1972 the fabrication of the prototype 8-inch major caliber lightweight gun has been completed and the gun has just successfully completed initial operational evaluation. The required documentation and range tables for the gun will be developed during fiscal year 1973.

Chairman ELLENDER. I note a sizable increase in your request for MK–68 improvement, for which $538,000 was provided in fiscal year 1972 and for which you are requesting $1.5 million for fiscal year 1973. Why do you need this increase?

Dr. FROSCH. The fiscal year 1972 work was directed toward feasibility tests and a request for proposals from a number of contractors. A contractor will be selected during fiscal year 1972 with fabrication of hardware to commence in fiscal year 1973 which will account for the cost increase.

MARINE CORPS WEAPONRY

Chairman ELLENDER. Of the total requested for ordnance, $1.6 million is for the program entitled "Marine Corps Weaponry." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Marine Corps Weaponry (Engineering)

Category: Engineering Development

Budget Activity: 6-Ordnance, Combat Vehicles and Related Equipment

DESCRIPTION: This Program Element provides RDT&E funds for the engineering development of all Marine Corps ordnance items and combat vehicles. In FY 1973, the following three projects are included in this Program Element:

a. Lightweight Air Defense Weapon System (LADS), 1701 - This project will produce a man-transportable surface-to-air missile system capable of acquiring, intercepting and defeating aircraft from all aspects. This system will replace the current REDEYE Guided Missile System.

b. Mobile Surface-Air Missile System (MSAMS), 1703 - This missile system will be capable of accompanying landing forces and providing effective all-weather protection against the combined threat of tactical aircraft, air-to-surface missiles and surface-to-surface missiles and rockets during the conduct of amphibious operations. The Improved Hawk System is being pursued as an interim solution to the MSAMS requirement.

c. Tactical Motor Transport Vehicles (Engineering), 4103 - This program will provide for the continuing engineering development of components and systems which will significantly increase the capability and maintainability of tactical motor transport equipment.

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WORK PERFORMED BY:

a. LADS - General Dynamics Corporation, Pomona, California; Atlantic Research Corporation, Cosa Mesa, California; U.S. Army Missile Command, Huntsville, Alabama.

b. MSAMS - Raytheon Company, Andover, Massachusetts.

c. Tactical Motor Transport Vehicles (Engineering) - All of the tasks are administered by the U.S. Army Tank-Automotive Command, Warren, Michigan.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program:

a. Lightweight Air Defense Weapon System (LADS) - System development, including night vision and identification, friend or foe (IFF) work, will continue. The seeker rocket motor integration will be finalized and final system configuration will be determined. The rocket motor development will continue towards man-rating.

b. Mobile Surface-to-Air Missile System (MSAMS) - System configuration will be completed. An analysis to determine the feasibility of adapting the Improved Platoon Command Post (IPCP) for use as a Battalion Command Post (BCP) will also be completed as will missile reliability tests.

c. Tactical Motor Transport Vehicles (Engineering) - The FY 1972 effort will provide for the continuation of engineering tests and evaluation related to the equipment/systems previously discussed. More particularly, work on a dolly set suitable for transporting various types of rigid wall shelters in the Fleet Marine Forces and improvement of the 1/2 ton Mechanical Mule will be completed. In addition, a project to investigate the feasibility of using the present armor system developed for 2 1/2 and 5 ton trucks on other Marine Corps vehicles will be initiated.

FY 1973 Planned Program:

a. Lightweight Air Defense Weapon System (LADS) - Engineering Development as discussed under the FY 1972 program will continue.

b. Mobile Surface-to-Air Missile System (MSAMS) - The Engineering Development of the Improved Platoon Command Post (IPCP) adaptation to Battalion Command Post (BCP) will be initiated if feasibility is established in FY 1972. The IPCP will be in production. The FY 1973 development program must be accomplished on schedule to maintain pace with the overall Improved HAWK program. In FY 1973 this project will be incorporated into the MSAMS project.

c. Tactical Motor Transport Vehicles (Engineering) - Efforts to increase the performance envelope of tactical vehicles by the adaptation of improved components/modifications will continue. Emphasis will be placed on an expansion of diagnostic test equipment activities.

Program to Completion: This is a continuing Program Element; therefore, only the FY 1973 projects will be addressed:

a. Lightweight Air Defense Weapon System (LADS) - The Initial Operational Capability (IOC) is scheduled for FY 1977.

b. Mobile Surface-to-Air Missile System (MSAMS) - The Improved HAWK System IOC is scheduled for FY 1974. The follow-on MSAMS will proceed in Engineering Development to meet the post-1975 threat in this area.

c. Tactical Motor Transport Vehicles (Engineering) - This project is characterized by short research and/or development cycles and will continually pursue tasks in the areas described above. Consequently, no milestones can be specified.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	2087	1250	1550	Continuing	NA

MARINE CORPS WEAPONRY

Chairman ELLENDER. Of the total requested for Marine Corps weaponry, $1 million is for the project entitled "Lightweight Air Defense Weapon System (LADS)." Please comment on this project and tell us what you hope to accomplish in fiscal year 1973 with the funds you have requested.

General BROOKS. The LADS project will produce a man-transportable surface-to-air missile system capable of acquiring, intercepting and defeating aircraft from all aspects. This system will replace the current REDEYE guided missile system. In fiscal year 1973, fiscal year 1972 engineering development activities will continue. System development, including night vision and identification, friend or foe (IFF) work, will be pursued. Rocket motor development will continue toward man-rating.

Senator YOUNG. $400,000 is requested for the project entitled "Mobile Surface-Air Missile System." Please comment on this project.

General BROOKS. The mobile surface-air missile system (MSAMS) will be capable of accompanying landing forces and providing effective all-weather protection against the combined threat of tactical aircraft, air-to-surface missiles and surface-to-surface missiles and rockets during the conduct of amphibious operations. The improved HAWK system is being pursued as an interim solution to the MSAMS requirement. The $400,000 requested for fiscal year 1973 will fund the engineering development of the improved platoon command post adaptation to battalion command post if feasibility is established this fiscal year.

Chairman ELLENDER. $150,000 is requested for the project entitled "Tactical Motor Transport Vehicles." Please comment on this project, and tell us why, according to the project listing, no funds were provided for it in fiscal year 1972.

General BROOKS. The tactical motor transport vehicles program will provide for the continuing engineering development of components and systems which will significantly increase the capability and maintainability of tactical motor transport equipment. This project was funded in fiscal year 1972. However, the amount required was not determined until too late in the planning-programing-budgeting cycle to include in it the original funding request for fiscal year 1972; $100,000 has been provided through Marine Corps reprograming to complete efforts related to a dolly set suitable for transporting various types of rigid wall shelters in the Fleet Marine Force and improvement of the one-half-ton mechanical mule. In addition, an investigation of the feasibility of using the present armor system developed for 2½- and 5-ton trucks on other Marine Corps vehicles has been initiated.

OTHER EQUIPMENT

Chairman ELLENDER. The next budget activity to be considered is "Other Equipment," for which you are requesting $511.7 million for fiscal year 1973. How much was provided for this budget activity in fiscal years 1971 and 1972?

Dr. FROSCH. A total of $367 million was provided for this budget activity in fiscal year 1971, and the fiscal year 1972 estimate is $446.8 million.

OTHER MARINE CORPS DEVELOPMENTS

Chairman ELLENDER. Of the total requested for other equipment, $935,000 is for the project entitled "Other Marine Corps Developments (Operational Systems)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

OTHER MARINE CORPS DEVELOPMENT (OPERATIONAL SYSTEMS)

Descriptive.—This Program Element provides RDT&E funds for the operational systems development of all Marine Corps items except those in the areas of weaponry and vehicles, data systems and telecommunications. In FY 1973, the following projects are included in this Program Element:

a. Marine Corps Operational Electronics Development, 3118.—A continuing requirements exists to provide a quick response to field identified deficiencies and research supported improvements to existing communications equipment. Efforts are categorized as Ground Radar, Aviation Radar, Test Equipment and Electronic Warfare Equipment Product Improvement.

b. *Marine Corps Operational Logistics Development, 4104.*—The purpose of this project is to enhance the operational capability and efficiency of engineer equipment required in support of the Fleet Marine Force. This effort supports a continuing requirement to improve engineer construction/destruction, material handling, utilities and reproduction equipment, and to improve the present capability to transport, store, distribute and dispense fuels in support of Marine Corps air and ground forces in amphibious operations.

Work performed by:

a. *Marine Corps Operational Electronics Development.*—Various: Data Products, Stanford, Conn.; Land Warfare Labs, Aberdeen, Md.; New York University; U.S. Navy Metrology Engineering Center; Navy Resarch Labs; Electronic Laboratories, Inc., Scottsdale, Arizona.

b. *Marine Corps Operational Logistics Development*—Various: Northrop Corporation, Hawthorne, Calif.; Marine Corps Supply Center, Albany, Georgia; Tobyhanna Army Depot, Tobyhanna, Pa.; Virginia Military Institute, Lexington, Va.

Program accomplishments and future programs:

Fiscal year 1972 program:

a. *Marine Corps Operational Electronics Development*—Many of the efforts initiated in fiscal year 1971 will continue. Identification Friend or Foe (IFF) components for various air search radars will be upgraded.

b. *Marine Corps Operational Logistics Development*—A continuing effort is underway to evaluate commercially produced relocatable buildings and shelters. Action will be taken to simplify the componentry and change the design characteristics of the 600 series generators. A system for the distribution of drinking water, flood light tower development and improved Marine Corps green paint efforts will also be pursued.

Fiscal year 1973 planned program:

a. *Marine Corps Operational Electronics Development*—Annual funding is provided for the Marine Corps share of a joint service, Department of Defense and [deleted] project for the collection and dissemination of information concerning electronic test and measuring equipment. In addition, improvements in decoders, interrogators, defruiters and MK XII (a secure mode) in existing IFF systems is planned. Support will be provided for the radars of the Marine Air Command/Control System (MACCS); i.e., AN/TPS-32, AN/UPS-1, AN/TPS-34

b. *Marine Corps Operational Logistics Development*—Relocatable building evaluation, engineer crane equipment test and evaluation and engineer equipment product improvement efforts will be performed.

Program to Completion:

a. *Marine Corps Operational Electronics Development*—This is a continuing program for the investigation, design, construction, evaluation and modification of operational electronics equipment.

b. *Marine Corps Operational Logistics Development*—This project is characterized by continuous evaluation and service testing. Work of the nature described previously will be pursued.

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Resources (In thousands of dollars):
R.D.T. & E.N. funds for fiscal year 1971, $5,036; fiscal year 1972, $1,250; fiscal year 1973, $935; additional funds to completion are continuing; and the total estimated cost is not available.

Other Marine Corps Developments

Chairman Ellender. $700,000 is for the project entitled "Marine Corps operational electronics development." Please comment on this project.

General Brooks. A continuing requirement exists to provide a quick response to field identified deficiencies and research supported improvement to existing communications equipment. Efforts are categorized as ground radar, aviation radar, test equipment, and electronic warfare equipment product improvement.

Senator Young. What are you planning to do with the $700,000 you are requested for fiscal year 1973?

General Brooks. Annual funding is provided for the Marine Corps share of a joint service, Department of Defense [deleted] projects for the collection and dissemination of information concerning electronic test and measuring equipment. In addition, improvements in decoders, interrogators, defruiters, and MK XII (a secure mode) in existing IFF systems is planned. Support will be provided for the radars of the Marine Air Command/Control System (MACCS); that is AN/TPS–32, AN/UPS–1 and AN/TPS–34.

Chairman Ellender. $235,000 is for the project entitled "Marine Corps operational logistics development." On page 502 of the descriptive summary under the description of your program for fiscal year 1972, I note reference to "improved Marine Corps green paint efforts." Just what do you mean by this phrase, and why are R. & D. funds needed for it?

General Brooks. The green paint currently being used by the Marine Corps on field equipment frequently displays color inconsistencies, inadequate service properties and short service life. The objective of the improved U.S Marine Corps 23 green paint project is to provide a significantly improved paint with not only increased durability but also possessing counter-surveillance and solar heat reflecting characteristics. Increased field use of heat producing electronic equipment and improved surveillance techniquies necessitate that infrared signature of vehicles and vans be degraded to the maximum extent possible in order to avoid detection. Further, in order to reduce failures of van-mounted electronic equipment due to high temperature, it is essential that solar heat be minimized. Improved U.S. Marine Corps 23 green paint will materially contribute to these essential reductions while alleviating the durability deficiencies associated with the current product.

Senator Young. Please describe your planned program for fiscal year 1973 for this project and tell us what you plan to do with the funds you are requesting.

General Brooks. Relocatable building evaluation, engineer crane equipment test and evaluation, and engineer equipment product improvement efforts are planned for fiscal year 1973.

Marine Corps Operational Data Systems

Chairman Ellender. $2.7 million is requested for the program entitled "Marine Corps operational data systems." Of this total, $500,-

000 is for the project entitled "tactical air control systems/tactical air defense systems joint interface program." Please comment on this system and your need for the $500,000 you are requesting.

General BROOKS. The tactical air control systems/tactical air defense systems joint interface program will provide unified commanders with a flexible, cohesive air control/defense system. The objective is to test the compatibility, interoperability and joint operational effectiveness of the interfaced data systems. In fiscal year 1973, formal interface testing will be initiated. The design and refinement of test plans and procedures will continue. Continued procurement/lease of equipment and contractor software support will be funded.

Chairman ELLENDER. Of the total of $2.7 million requested, $2.2 million is for the project entitled "Marine air command and control system." Please comment on this project and tell us how you will use the funds you are requesting for fiscal year 1973.

General BROOKS. The Marine air command and control system operational development effort will insure that automated equipments developed for the Marine air command and control system (MACCS) achieve total interoperability and compatibility. The integration of these equipments will complete the automation of those functional elements within the MACCS which have been most severely affected by the advancing technology in air warfare and communications/electronics. This program is being initiated in fiscal year 1973. It is presently envisioned that the MACCS will evolve into the Tactical Air Operations System (TAO) under the Marine Tactical Command and control systems concept. Fiscal year 1973 funding will be required for preliminary technical system model definition for the TAO. Integration testing and evaluation of MACCS equipment, that is, tactical air command central, tactical air operations central, radar course directing central, direct air support central and improved Hawk will be initiated. A Mode IV identification friend or foe (IFF) prototype development and testing with the tactical air operations central (TAOC) will be accomplished. Prototype development for the improved TAOC, based on the results of a fiscal year 1972 cost effectiveness evaluation, will be initiated. The development and testing of a standard tactical digital information link B (TADIL B) buffer and modem for all MACCS equipments will be continued. Funding will be required for AN/TPQ–27 (radar course directing central) modifications resulting from service test results in fiscal year 1972. Testing of a prototype communication security shelter as well as the development of attendant TADIL B computer software must be completed in fiscal year 1973 to meet the requirements of the joint tactical air control systems/tactical air defense systems testing schedule. The forward air controller targeting system (FACTS) is scheduled for prototype development, testing and evaluation.

JOINT TACTICAL COMMUNICATIONS PROGRAM

Chairman ELLENDER. $3.1 million is requested for the joint tactical communications program, referred to as TRITAC. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Joint Tactical Communications Program (TRI-TAC), Marine Corps

Category: Operational Systems Development

Budget Activity: 7-Other Equipment

DESCRIPTION: Provides RDT&E funds for the development of all Marine Corps Telecommunications items. In FY 1973 the following projects are included in this Program Element.

a. Tactical Message Distribution and Voice Communication Equipment, 3108 - A combination of modular equipments to provide terminal and entry facilities which will utilize existing communications means for the transmission, reception, routing, and distribution of digitally coded information.

b. Tactical Satellite Communication Equipment, 3109 - Will provide extended communications equipments for links and enhance existing links with improved reliability, antijam protection, and decreased susceptibility to direction finding.

c. Landing Force Integrated Communications System (LFICS) Implementation, 3114 - Funds modifications to existing communications equipment. Provides guidance to insure complete interoperability of communication equipment within the Marine Corps by 1977.

d. Electromagnetic Compatibility Analysis Center (ECAC) Support, 3115 - Provides funds for ECAC support to the Marine Corps to insure that the projects meet electromagnetic compatibility requirements.

e. Tactical Electronic Switching Facilities, 3119 - Efforts include a 30 line man-packable, cordless semiautomatic telephone switchboard for use at battalion and regimental levels and a technical control facility for the control of telecommunications circuits.

f. Transmission Subsystems Improvements, 3125 - Provides capability to respond to field initiated requests for modifications and improvements of tactical communications hardware.

g. Tri-Service Tactical Communications System (TRI-TAC) Implementation, 3126 - The TRI-TAC program is a joint effort, recently initiated. FY 1973 funding was inserted into Marine Corps programming by the Office of the Secretary of Defense (OSD) for Marine Corps participation.

h. Power Source Systems, 4102 - Supports improvements on existing power sources and the development of high capacity primary and secondary batteries, thermoelectric devices, and solid state power conditioning equipment.

WORK PERFORMED BY:

a. Tactical Message Distribution and Voice Communication Equipment - Litton Industries, Van Nuys, California.

b. Tactical Satellite Communications Equipment - RCA, Camden, New Jersey; Collins Radio Company, Cedar Rapids, Iowa; Sylvania Electronic Systems, Eastern Division, Needham Heights, Massachusetts; U.S. Army Satellite Communications Agency, Fort Monmouth, New Jersey.

c. Landing Force Integrated Communications System (LFICS) Implementation - Martin-Marietta Corporation, Orlando, Florida.

d. Electromagnetic Compatibility Analysis Center (ECAC) Support - ECAC uses consolidated Department of Defense (DOD) funding (Army, Navy, Air Force, Marine Corps) to fund their supporting contractor, Illinois Institute of Technology Research Institute (IITRI), who provides "in-house" personnel to ECAC.

e. Tactical Electronic Switching Facilities - Sylvania, Needham Heights, Massachusetts.

f. Transmission Subsystems Improvements - Data Products, Stanford, Connecticut; Land Warfare Laboratories, Aberdeen, Maryland; Magnavox Company, Fort Wayne, Indiana; RF Communications, Incorporated, Rochester, New York; New York University; Western Reserve Electronics, Incorporated, Cleveland, Ohio; U.S. Navy Metrology Engineering Center; Navy Research Laboratories; Radio Engineering Products, Montreal, Canada; Electronic Laboratories, Incorporated, Scottsdale, Arizona.

g. Tri-Service Tactical Communications System (TRI-TAC) Implementation - Undetermined.

h. Power Source Systems - Power Conversion, Incorporated, Long Island, New York; Yardney Electric Company, Pawcatuck, Connecticut, U.S. Army Electronics Command, Fort Monmouth, New Jersey.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program:

a. Tactical Message Distribution and Voice Communication Equipment - Evaluation testing of the equipment will be completed. Deficiencies identified during the test period, as well as increased speed capability will be studied and evaluated for possible incorporation in the test models of the Data Transmission and Switching (DTAS) equipment for additional service/troop testing prior to production contracting.

b. Tactical Satellite Communications Equipment - The Interim Operational Capability will continue in FY 1972 while contract definition progresses for additional ultra high frequency (UHF) satellites and UHF terminals to meet Marine Corps and other Service needs.

c. Landing Force Integrated Communications System (LFICS) Implementation - Study scheduled for completion during FY 1972.

d. Electromagnetic Compatibility Analysis Center (ECAC) Support - During FY 1972 support is needed for LFICS study/implementation. LFICS support will consist of frequency plan analysis during the first half FY 1972 and frequency management development during the second half FY 1972.

e. Tactical Electronic Switching Facilities - Conduct service testing of Technical Control Facility AN/TSC-62 obtained from the Air Force. Complete development of the service test models of the switchboard SB-3614 and the CV-2907 converter and begin service testing of both models.

f. Transmission Subsystems Improvement - Continuation of efforts initiated in 1971, to include development of VHF radio multicoupler which will allow using one antenna with several tactical radios; and development of a noise reducing handset for use with tactical radio equipment. In the area of wire product improvement two technical control vans purchased from the U.S. Air Force are being modified to meet the Marine Corps' requirement. The radio multicoupler is in the very high frequency (VHF) range.

g. Tri-Service Tactical Communications System (TRI-TAC) Implementation - None.

h. Power Source Systems - The Marine Corps is participating with the Army in a joint program to develop lightweight, silent power sources in the area of electro-chemical power source development. Participation

in the area of primary and secondary batteries will be initiated. Investigation of thermal conversion by thermionic means will be limited to keeping abreast of the state-of-the-art.

FY 1973 Program:

a. Tactical Message Distribution and Voice Communication Equipment - Since the DTAS equipment will provide an information exchange capability for Marine Corps command and control systems, it will be necessary to insure sufficient flexibility to permit interface/interoperability with other systems currently in early stages of research and development. Much of this interface can be achieved with software modification in the Data Transmission and Switching (DTAS) division level terminal and minimal hardware modification. However, the software requirements will not be fully defined until the basic DTAS FY 1972 testing and tradeoff studies are completed.

b. Tactical Satellite Communications Equipment - Additional satellites will be procured in FY 1973 to accommodate the modified advanced development terminals and initial procurement of ground ultra high frequency (UHF) terminals to meet the highest priority requirements of the Fleet Marine Forces. Full scale engineering development of a vehicular super high frequency (SHF) terminal must begin to keep pace with SHF satellite launches.

c. Landing Force Integrated Communications System (LFICS) Implementation - Early emphasis will be directed towards repackaging. Modifications and proper ancillary items (such as antennas and terminal devices) will be developed in order to retrofit LFICS standards and design objectives.

d. Electromagnetic Compatibility Analysis Center (ECAC) Support of the Marine Corps - Funds are required for compatibility analyses to support LFICS efforts, Marine Corps Tactical Systems Support Activity operation, Position Location Reporting System development, and minor projects to be identified. Identification of electromagnetic interference is required early in the development of these systems.

e. Tactical Electronic Switching Facilities - Complete service testing and evaluation of the switchboard SB-3614 and the converter CV-2907 and adopt both for Marine Corps use. Write a production specification for and award a production contract for both items. Perform modification to the AN/TSC-62 Technical Control Facility required as a result of the service testing.

f. Transmission Subsystems Improvements - Several of the projects such as compandor handsets, reducing bulk and weight of high frequency radios, wireless remote systems, and integration of radio and wire equipment will continue. Proposed efforts include laser communication devices, optical page scanners, and facsimile.

g. Tri-Service Tactical Communications System (TRI-TAC) Implementation - FY 1973 funds have been allocated to provide for the Marine Corps portion of TRI-TAC efforts.

h. Power Source Systems - Efforts will continue in coordination with the Army based on accomplishments resulting from present advanced development programs.

Program to Completion:

a. Tactical Message Distribution and Voice Communication Equipment - Evaluation of the test models will be completed during FY 1974. Subsequent applications of DTAS will be related to the command and control projects with which interface is required. Procurement is programmed over a five year phased production with first funding scheduled for 1975.

b. Tactical Satellite Communication Equipment - Ultra high frequency (UHF) satellites are scheduled for launch during FY 1975. Additional development and testing effort will be required to perfect improved anti-jam, multiple access modems and to obtain the desired reliability for the super high frequency (SHF) vehicular and manpack terminals. Full scale production should begin during FY 1976 with a joint Marine Corps/Army procurement of vehicular and manpack terminals.

c. Landing Force Integrated Communications System (LFICS) Implementation - Follow-on efforts will be required to adopt/replace minor end items (telephones, handsets, etc.) and interface modules, and perform system/interface tests. End FY 1977 is planned objective for operational LFICS in the Fleet Marine Force (FMF); i.e., entire tactical communications inventory to be fully integrated with system/technical control, operational standards, and partial system automation established. FY 1977 funds will be required to accomplish LFICS phase-in, to include full Integrated Logistics Support (ILS) planning documentation.

d. Electromagnetic Compatibility Analysis Center (ECAC) Support of the Marine Corps - For FY 1974 and subsequent years, ECAC support will be required for compatibility analyses to support LFICS efforts, Marine Corps Tactical Systems Support Activity operation, Position Location Reporting System (PLRS) development, and minor projects to be identified.

e. Tactical Electronic Switching Facilities - During FY 1974-1975 integrate the electronics switching facilities and the technical control facilities into a complete telecommunications system and conduct total system testing. Procure required ancillary equipment and any possible interface equipment during FY 1976-1977.

f. Transmission Subsystems Improvements - This is a continuing program for the investigation, design, construction and evaluation and modification of operational electronics equipment. Efforts of the general nature described above will continue in this time frame.

g. Tri-Service Tactical Communications System (TRI-TAC) Implementation - No out year funding is programmed at this time.

h. Power Source Systems - Engineering development in FY 1974 will provide the basis for the application of lithium-organic electrolyte batteries to a wide range of military electronic equipment and devices in the communication, surveillance, and night vision areas where size, weight, cost, and wide temperature range capability are critical requirements. Design data realized from the advanced development of the thermionic module will provide the basis for the engineering development for a complete thermionic system design including multi-fuel burner, power conditioning, fuel feed, thermal equilibrium, and self-protection in FY 1974.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	1475	1310	3120	Continuing	NA

JOINT TACTICAL COMMUNICATIONS PROGRAM

Chairman ELLENDER. Please provide a tabulation for record listing the projects to be funded under this program, the amounts for each for fiscal year 1971 and 1972, and the request for fiscal year 1973.

General BROOKS. I will be glad to do so.

(The information follows:)

TRITAC

[In thousands of dollars]

	Fiscal year—		
	1971 actual	1972 estimate	1973 estimate
C3108—Tactical message distribution and voice communications equipment	500	300	200
C3108—Tactical satellite communications equipment	539	200	450
C3114—Landing force integrated communications system (LFICS)	55	----	150
C3315—Electromagnetic compatibility center support for the Marine Corps	----	60	120
C3118—Marine Corps operational electronics development	205	450	----
C3119—Tactical electornic switching facilities	1	200	200
C3125—Transmission subsystem improvements	----	----	200
C3126—TRITAC implementation	----	----	1,600
C4102—Power source systems	175	100	200
Total	1,475	1,310	3,120

Chairman ELLENDER. Are you requesting funds for any projects which have not been funded in previous fiscal years? If so, please give us a brief description of them and comment on your need for the funds requested.

General BROOKS. Although two projects appear to have been unfunded in previous fiscal years, transmission subsystem improvements and TRITAC implementation, only one, TRITAC implementation, received no funding in prior years. Before the establishment of the TRITAC program element, transmission subsystem improvements, which will provide a capability to respond to field initiated requests for modifications and improvements of tactical communications hardware, was funded under a Marine Corps operational electronics development effort. In fiscal year 1973, work on compandor handsets, reducing bulk and weight of high frequency radios, wireless remote systems, and integration of radio and wire equipment will be pursued. Proposed efforts include laser communication devices, optical page scanners, and facsimile. As for the TRITAC program, it is a recently initiated joint project. Fiscal year 1973 funding was inserted into Marine Corps programing by the Office of the Secretary of Defense for Marine Corps participation in the TRITAC effort.

Senator YOUNG. Comment on your need for the increase of $1.8 million you are requesting for TRITAC.

General BROOKS. $1.6 million was allocated to the Marine Corps by the Office of the Secretary of Defense to provide for our portion of TRITAC efforts. Particular telecommunications activities to be pursued during fiscal year 1973 will be defined soon. TRITAC is currently determining individual service efforts in this area.

UNDERSEA SURVEILLANCE

Chairman ELLENDER. [Deleted] is requested for the program entitled "Undersea Surveillance." Has the committee been furnished with complete details on this program?

Dr. FROSCH. Yes, sir, program and project details have been furnished.

TARGET SURVEILLANCE TECHNOLOGY

Chairman ELLENDER. $38.1 million is requested for the exploratory development program entitled "Target Surveillance Technology." Pages 517 and 518 of the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

TARGET SURVEILLANCE TECHNOLOGY

Description—Surveillance Technology includes exploratory development for improvement of undersea and surface/aerospace sensor systems and to develop technology for future systems aimed at the detection, identification, classification, and localization of undersea and surface/aerospace targets. Technology involved includes sonar, infra-red and optical frequencies in the elecromagnetic spectrum, electromagnetic sensors at various frequencies, magnetics, lasers, etc. Both active and passive electromagnetic surveillance is included.

Work performed by:

Undersea Target Surveillance.—Many laboratories and contractors are involved in carrying out this work, with the major Navy activities being the Naval Air Development Center, Warminster, Penn.; Naval Research Laboratory, Washington, D.C.; Naval Ordnance Laboratory, White Oak, Md.; Naval Undersea Warfare Center, San Diego, Calif.; Naval Undersea Research and Development Center, San Diego, Cal.; Naval Underwater Systems Center, New London, Conn.; Naval Ship Research and Development Center, Carderock, Md.; Naval Ship Research and Development Laboratory, Panama City, Fla. Typical contractors include Magnavox Company, Fort Wayne, Ind.; Texas Instruments, Dallas, Texas; Sanders Associates, Nashua, N.H.; Bunker Ramo, Canago Park, Cal.; American Electronic Laboratories, Colmar, Penn.; Instrument Systems Corps., Huntington, L.I., N.Y.; Sylvania Electric Products Inc., Waltham, Mass., and Mountain View, Cal.; Westinghouse, Baltimore, Md.; Bell Telephone Laboratories, Whippany, N.J.; Applied Research Laboratory, Austin, Texas; General Electric Co., Syracuse, N.Y.; General Dynamics, Groton, Conn.; UNITECH Inc., Austin, Texas; Purdue Research Foundation, Lafayette, Ind.; A. D. Little, Inc., Boston, Mass.; Tracor, Inc., Austin, Tex.; Hughes, Fullerton, Calif.; Marine Physical Laboratory, Scripps Inst., San Diego, Cal.; Presearch Inc., Silver Spring, Md.; and Radian, Inc., Austin, Texas.

Surface/Aerospace Target Surveillance.—Typical laboratories and contractors include: Naval Research Laboratory, Washington, D.C.; Naval Weapons Center, China Lake, Cal.; Naval Electronic Laboratory Center, San Diego, Cal.; Naval Air Development Center, Warminster, Pa.; Naval Photographic Center, Washington, D.C.; International Telephone & Telegraph, Gilfillan Inc., Los Angeles, Cal.; Litton Industries, Silver Springs, Md.; Instrument Systems Corp., Huntington, L.I., N.Y.; Sylvania, Mountain View, Calif.; Bendix Corp., N. Hollywood, Cal.; Texas Instruments, Inc., Dallas, Texas; Georgia Institute of Technology, Atlanta, Ga.; Radio Corp. of America, Moorestown, N.J.; Sperry Gyroscope, Great Neck, L.I., N.Y.; North American Rockwell, Los Angeles, Cal.; Raytheon (Antometrics), Alexandria, Va., and others.

TARGET SURVEILLANCE TECHNOLOGY

Chairman ELLENDER. Please provide a tabulation listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972 and the request for fiscal year 1973.

Admiral DAVIES. I will be happy to do so.

(The information follows:)

	Fiscal year—		
	1971	1972	1973
F05 111—Systems analysis surv (ABN)	966	941	856
F05 121—Acoustic U/S surv (gen)	2,972	2,734	4,128
F05 141—Radio freq aerospace surv	442	466	435
F05 151—Multipur radio freq surv	1,458	1,807	2,557
F05 152—Multipur opt/IR/[deleted] surv		235	287
F08 111—Systems analysis (ABN)	424	618	820
F08 121—Acoustic U/S surv (ABN)	5,869	6,512	5,137
F08 122—Radio freq undersea surv	473	666	712
F08 123—Opt/IR/[deleted] undersea surv	1,484	1,937	1,789
F08 124—Magnetic undersea surv	396	404	456
F08 125—Spec/unconv undersea surv	838	662	1,311
F08 131—Radio freq surf surv (ABN)		35	120
F08 132—Opt/IR/[deleted] surface surv (ABN)	1,172	1,131	1,165
F08 141—Radio freq aerospace surv (ABN)	275	328	426
F08 151—Multipur radio freq surv (ABN)	1,084	1,119	938
F08 152—Multipur opt/IR/surv (ABN)	439	324	319
F11 111—Systems analysis	1,054	919	1,413
F11 121—Acoustic undersea surv	8,209	7,924	8,065
F11 141—Radio freq aerospace surv (ship)	2,219	2,355	2,141
F11 151—Multipur radio freq surv (ship)	531	532	485
F11 152—Multipur opt/IR/[deleted] surv (ship)	173	231	346
F26 121—Acoustic undersea surv	1,120	1,252	1,138
F27 371—Spec/unconv undersea surv		570	
F48 111—Systems analysis (ABN)	1,366	2,125	2,400
F53 151—Multipur radio freq surv (MC)		465	620
Total	32,964	36,292	38,064

Chairman ELLENDER. Is the work on any of these projects being performed by one of the Federal contract research centers?

Admiral DAVIES. Yes, sir. Approximately $200,000 of effort will be performed at Ordnance Research Laboratory, Pennsylvania State University. This effort is in support of acoustic warfare and accoustic deception devices.

Chairman ELLENDER. Of the total requested for target surveillance, I note that $4.1 million is for the project entitled "Acoustic Undersea Surveillance (General)." Can you give us a brief, unclassified description of this project, and tell us what you hope to accomplish in fiscal year 1973?

Admiral DAVIES. The effort in this project is directed to the development of technology and concepts for the detection, classification and localization of undersea targets using either fixed or mobile platforms.

During fiscal year 1973 towed array technology developments will include: [Deleted.]

Senator YOUNG. I note on page 535 of the descriptive summary that $3.1 million of the $4.1 million requested is part of the Navy oceanographic program. Please comment on this statement.

Admiral DAVIES. In order to show greater visibility to the Navy's oceanographic report, the descriptive summaries have been annotated to show what portion of the program element or project is included in the Navy oceanographic program. In this case of the $4,128,000 requested for this project in fiscal year 1973, there are four task areas totaling $3,079,000 which deal with the sonar detection/classification and acoustic phases of the Navy oceanographic program.

Chairman ELLENDER. Why do you need the increase of $1.4 million you are requesting for acoustic undersea surveillance?

Admiral DAVIES [Deleted.]

Senator YOUNG. Please comment on the project entitled "Multipurpose Radar Frequency Surveillance" for which you are requesting $2.6 million.

Admiral DAVIES. The objective of this project is to provide the Navy with a diversified, in-depth capability for the exploratory development of new and unique electronic techniques and equipments necessary to the development of operational systems capable of detecting, identifying, and tracking targets of interest which are operating in the aero-space environment and which may enjoy an ECCM (Electronic Counter Counter Measures) cover. This objective is approached through the maintenance of a strong in-house effort which: develops new, and improves existing, passive ECM (Electronic Countermeasure) techniques and systems; investigates the feasibility of advanced radar system concepts such as over-the-horizon surveillance and frequency-agile radars; and develops new and unique secure IFF (Identification Friend-or-Foe) techniques/systems. For fiscal year 1973 the over-the-horizon program will continue to identify and exploit areas of potential Navy application. Increased emphasis will be given to automatic detection analyses and techniques. [Deleted] radar systems will be used in open ocean surveillance developments. Improved power levels, detection, and range resolution will be achieved through the introduction of solid state pulse generating sources and the use of computers to analyze the high-rate data. The use of surface wave devices will be investigated for possible application to [deleted] IFF systems.

Chairman ELLENDER. You are requesting $5.1 million for the project entitled "Acoustic Undersea Surveillance (Airborne)." Give us a short unclassified description of this project.

Admiral DAVIES. This project encompasses exploratory effort in underwater acoustics technology, the utilization of this technology in sensors and related airborne equipments for the detection, classificaton, localization, and tracking of submarines.

Senator YOUNG. Just what will you do with the $5.1 million you are requesting, and why is your request for fiscal year 1973 lower than the amount provided for fiscal year 1972?

Admiral DAVIES. Three areas [deleted] and a comprehensive program of component development to provide the basis for more reliable, less costly sonobuoys intiated in fiscal year 1971 will continue into fiscal year 1973. The effort on [deleted] is expected to be completed early in the year and fully transitioned into advanced development. Similarly portions of the [deleted] will be moved to advanced development and effort will be concentrated on further reduction in size of components and [deleted]. Component development of new techniques [deleted] will be initiated. New [deleted] will continue.

The planned transition of both Helo [deleted] into advanced development early in the year is the reason the fiscal year 1973 request is lower than the amount provided for fiscal year 1972.

Chairman ELLENDER. You are requesting $8.1 million for a project entitled "Acoustic Undersea Surveillance (Shipboard)." Please describe this project, and tell us why you need the increase of $141 thousand you are requesting for fiscal year 1973.

Admiral DAVIES. I will be glad to do so. This project encompasses naval ship systems command exploratory development program

planned to advance the technological areas need for increased capability in future submarine and surface ship sonars and naval electronics systems command exploratory development program in support of the [deleted] SOSUS (sound surveillance system). Major emphasis is placed on improving sonar systems to increase the detection, classification and localization capability.

[Deleted] $700,000 has been planned to support the exploratory development required. Much of this funding was rescheduled from lower priority effort but an additional $141,000 is required to maintain an effective program within the project.

Senator YOUNG. Please comment on the project entitled "Radio Frequency Aerospace Surveillance (Shipboard)" for which you are requesting $2.1 million.

Admiral DAVIES. Yes, sir.

The future air threat to the fleet will likely consist of a multiplicity of missiles and bombs, both nuclear and conventional, being launched from one of many high performance air, surface or subsurface platforms. [Deleted.] It is the objective of this subproject to develop techniques that will address the present problem areas and provide a basis for developing and integrating systems to meet the future threat. The approach followed to develop radar capabilities to meet this threat is: [deleted].

Chairman ELLENDER. Please comment on the project entitled "Systems Investigations, Astronautics Surveillance" for which you are requesting $2.4 million.

Admiral DAVIES. Prior effort was on feasibility of [deleted] ocean surface surveillance concepts. Current effort has been broadened to complement that [deleted] work now in advanced development and to examine the potential contribution of [deleted] systems to total ocean surveillance. [Deleted.]

COMMAND AND CONTROL TECHNOLOGY

Chairman ELLENDER. Of the total requested for other equipment, $20 million is for the program entitled "Command and Control Technology." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

COMMAND AND CONTROL TECHNOLOGY

Description.—Comprises exploratory development to support of Navy command and control systems which acquire, process and disseminate information required by a commander in planning, directing and controlling operations. Efforts encompass acoustic, electromagnetic, wire and other communications technology; acoustic, radio frequency, optical, geophysical, inertial and other navigation technology; and data processing, including information transformation, storage, retrieval, and display technology for ships, submarines, aircraft and shore activities. Efforts also include the acquisition of observational data for predicting the position of celestial and space bodies with a high degree of accuracy.

Work performed by.—The NAVSHIPS, NAVELEX and NOR efforts in this element are performed primarily by Navy Laboratories such as the Naval Electronic Laboratory Center, San Diego; the Naval Research Laboratory, Washington, D.C.; the Naval Ship Research and Development Center, Carderock and Annapolis, Md.; the Navy Underwater Systems Center, New London, Conn.;

the Naval Strategic Systems Navigation Facility, Brooklyn, N.Y.; and the Naval Observatory, Washington, D.C. Contractor technical assistance has been obtained from Honeywell Corp., St. Petersburg, Fla.; Ametek-Straza, El Cajon, Ca.; North American Rockwell, Autonetics Div., Anaheim, Ca.; RCA, Camden, N.J., Hughes Aircraft, Fullerton, Ca., TECHPLAN, Maple Shade, N.J.; UNIVAC, St. Paul, Minn.; Northrop Corp., Palos Verdes, Ca.; ECT, Inc., St. Petersburg, Fla.; and Computer Sciences Corp., Falls Church, Va. The NAVAIR efforts are approximately equally performed by industry and such Navy activities as the Naval Air Development Center, Warminster, Pa.; the Naval Avionic Facility, Indianapolis and the Naval Air Test Center, Patuxent River, Md. Industry work is performed by such companies as General Dynamics, San Diego; Hughes Aircraft, Culver City, Ca.; Ampex Corp. Redwood City, Ca.; Minneapolis Honeywell, St. Paul, Minn.; Raytheon Corp., Boston, Mass.; Westinghouse, Baltimore and Pittsburgh; and Texas Instruments, Dallas, Tex.

Program accomplishments and future program:

Fiscal 1972 program:

a. Evaluate components for Non-Acoustic Audio Coupling to the Head (NAACH) system, including the NAACH microphone, the NAACH earphone and a low noise solid state amplifier. Prepare a plan for integrating NAACH with digital avionics systems.

b. Analyze application of Pulse Position Choosing to single frequency and frequency hopping system.

c. Determine the feasibility of an experimental, [deleted] for shipboard use.

d. Continue investigation of feasibility of utilizing millimeter wave channels for naval communications. Evaluate a simple millimeter wave system.

e. Develop submarine communication buoy body designs [deleted.]

f. Develop techniques to increase the depth at which LORAN-C lock-on can be achieved.

g. Investigate the feasibility of submarine-to-aircraft HF communications, [deleted.]

h. Develop design techniques for small ship satellite antennas, including phased array concepts.

i. Investigate new approaches to display system architecture, such as a centrally located image processing and storage facility with user stations comprised of flat panel display screens interconnected with a single optical fiber multiplex transmission system.

j. Complete the SECANT-B collision avoidance system flight tests and analyze data to establish the design criteria for random binary sequence correlation equipment suitable for a militarized collision avoidance system.

k. Conduct a flight test demonstration of the Integrated Tactical Navigation System to evaluate the capability of the system to establish timing synchronization between two or more stations, establish two or more relative ranges to master stations, compute relative position in a grid established by master stations and perform an in-air alignment of a user aircraft's inertial platform.

l. Investigate stereoscopic displays which combine existing head mounted displays with a general purpose computer. Determine the physiological problem inherent in head mounted displays and head motion sensors. Investigate holographic techniques to determine the application of laser holographic displays to one or more specific avionic display problems. Evaluate multiple lens 3-D laser projection techniques.

m. Explore the feasibility of extending the Advanced Avionic Digital Computer program and certain other approaches to develop a standardized set of advanced computer hardware and software which would provide commonality and compatibility among all types of Naval and Marine Corps command and control systems of the future.

n. Investigate the use of atomic color centers as date storage media accessed by a laser beam. Determine the feasibility of this technology for high density memory systems.

o. Determine the position fix accuracy limits and characteristics of [deleted] required for a passive, non-vulnerable navigation system.

p. Determine the accuracy and performance of both the absolute and relative velocity measuring modes of operation of the Doppler Sonar Velocity Log. Perform theoretical analysis of detection susceptibility and conduct an at-sea performance evaluation aboard AG–153.

Fiscal year 1973 planned program:

a. Investigate the application of digital techniques to aircraft internal communications.

b. Establish systems concepts for incorporating 4800 bits per second (bps) terminals into advanced HF communnications systems for future aircraft.

c. Establish system requirements for a Global Rescue Alert Net (GRAN).

d. [Deleted.] Investigate techniques for utilizing coherent light systems in ship-to-air communications.

e. Complete testing of a feasibility model of the millimeter wave communications system.

f. [Deleted.]

g. Continue development of ELF propagation prediction techniques.

h. Assemble the advanced graphics system for a feasibility test.

i. Initiate development of shipboard implementation techniques for the ship's passive [deleted] navigation system. [These techniques should include design of real-time position determination processes, evaluation of sensor/instrumentation utilization and development of [deleted] techniques.]

j. Investigate the feasibility of utilizing fiber optic techniques in digital data transmission. Continue monitoring of new techniques and equipment for data conversion.

k. Continue development of the Marine Air Traffic Control and Landing System. Complete studies on mode II approach and landing requirements and investigate the feasibility of accomplishing automatic air traffic control.

l. Initiate procurement for developmental models of ferro-acoustic and closed flux memories for the Advanced Avionic Digital Computer.

m. Establish technical approaches and a program plan for the Quiet Task Force project. The plan shall address the means for information transfer during periods of Electromagnetic Control.

n. [Expand investigations into areas of [deleted] communications such as optical, millimeter wave, [deleted] communications technology].

o. Continue investigations relating to the high density, optical computer memory. Expand efforts for use of alkali-halide crystals in conjunction with laser deflection techniques for information storage and retrieval.

Resources (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, 17,099; fiscal year 1972, 17,929; fiscal year 1973, 20,077; additional funds to completion are continuing; and the total estimated cost is not available.

Command and Control Technology

Chairman Ellender. Please provide a tabulation for the record listing the projects to be funded under this program element, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Admiral Davies. I will be glad to do so.

(The information follows:)

	Fiscal year—		
	1971	1972	1973
F05 232—Radio freq nav tech (gen)		620	520
F05 235—Misc nav tech (gen)	644	640	608
F08 211—Systems investigations (air)		223	510
F08 232—Radio freq nav tech (air)	373	328	312
F08 234—Inertial navigation (air)	961	1,881	705
F08 235—Misc nav tech (air)	246	270	303
F08 243—Displays (air)	19		210
F11 231—Acoustic navigation (ship)	50	227	304
F11 232—Radio freq nav tech (ship)	126		
F11 233—Opt [deletd] navigation (ship)	55	50	
F11 234—Inertial navigation (ship)	747	423	308
F14 211—Systems analysis (cmd support)	752	1,038	1,815
F14 221—Acoustic communications	248	224	241
F14 222—Electromag comm (cmd support)	3,631	4,061	5,253
F14 224—Wire comm (cmd support)	298	276	259
F14 241—Info transformation (comd supp)	325	394	509
F14 242—Info storage/retrieval (cmd supp)	337	383	1,071
F14 243—Displays (command support)	465	489	411
F14 512—Spec lab support	196		
F15 222—Electromag comm (air)	1,466	1,455	1,624
F15 224—Wire communications (air)	222	105	160
F15 241—Info transfromation (air)	1,038	895	581
F20 241—Info transformation (missiles)	129		
F20 242—Info storage/retrieval (missiles)		245	470
F26 235—Misc nav tech (ship)	178	106	219
F38 211—Systems analysis (logistics)	132	96	54
F48 222—Electromag comm (astronautics)	2,034	1,835	1,397
F48 232—Radio freq nav tech (astro)	907	742	608
F53 222—Electromag comm (Marine Corps)	765	435	785
F53 241—Info transformation (Marine Corps)	555	438	675
F53 242—Info stor/retrieval (Marine orps)	200	50	165
Total	17,099	17,929	20,077

Senator YOUNG. Are you requesting funds for any projects which were not previously funded?

Admiral DAVIES. Yes, sir. We wish to resume the airborne display project. A survey of display techniques and devices has been completed and we now feel we have identified several very promising approaches for reducing the aircrew command and control burden.

Chairman ELLENDER. Why do you need the increase of $2.2 million you are requesting for fiscal year 1973?

Admiral DAVIES. This additional funding is required to support three new initiatives within existing projects: the quiet task force effort under systems analysis (command support), covert communications under electromagnet communications (command support) and an optical computer memory effort under information storage and retrieval (command support). The first two relate to the need for denying information to the enemy about our task force operations and the third is concerned with the need for very high density memories for signal processors.

Chairman ELLENDER. Of the total requested for command and control technology $5.3 million is for the project entitled "electromagnetic communications) command support". Give a short, unclassified description of your planned program for fiscal year 1973, and tell us why you need the increase of $1.2 million you are requesting.

Admiral DAVIES. The fiscal year 1973 planned program will include investigation of techniques to improve submarine and surface ship antenna systems, optical communications techniques investigations, evaluation of an advanced graphics system feasibility model, assembly of a demonstration model of a millimeter wave communications system, system definition studies for general automated

terminal equipment, tactical TV capability investigations, and satellite communications techniques. The increased funding is required to support covert communications efforts, a new initiative for fiscal year 1973.

Chairman ELLENDER. I note you are requesting a substantial increase for the project entitled "information storage and retrieval (command support)". Please comment on this project and the need for the increase you are requesting.

Admiral DAVIES. We have projected a very substantial increase in the amount of signal processing required of future command and control systems. Since this processing must be done in real-time, secondary storage capability will not suffice. Also, as we push the limits of the primary computer memory, we must resort to complex, costly programing techniques. To acquire the very high density primary memory we will need, we want to investigate a very promising optical memory technique which was developed in a basic research program. This technique indicates the feasibility of developing a read-write memory of very large capacity, with access times equal to present (third generation) mainly frame memories.

WEAPONRY TECHNOLOGY

Chairman ELLENDER. Of the total requested for other equipment, $77.2 million is for the program entitled "weaponry technology". Can you tell us briefly what the general objectives of this program are?

Admiral DAVIES. This element provides for the exploratory development of the technology applicable to the improvement and fabrication of new weapons, ordnance, and countermeasures components, subsystems, and systems which will meet the needs and requirements of the Navy. It provides for new and more effective means by which enemy ships, submarines, aircraft, surface armament, and other targets in the air, underwater, and on land may be defeated by destructive or nondestructive measures. Included is work on strategic and tactical weapon system concepts and component definition; guided and unguided missiles, torpedo and mine structures, and propulsion systems; warheads and fuzes, aerodynamics, hydrodynamics and ballistics; guidance and control; weapons launching and handling technology; special weapons technology; vulnerability to countermeasures and countermeasures technology.

WEAPONRY TECHNOLOGY

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded under this program element, the amounts for fiscal years 1971 and 1972 and the request for fiscal year 1973.

Admiral DAVIES. I will be happy to do so.

(The information follows:)

WEAPONRY TECHNOLOGY PROJECTS

[In thousands of dollars]

	Fiscal year—		
	1971	1972	1973
FXX 311—Nsap 1	1,019	1,304	2,845
F17 311—Systems anal strike W/F	1,676	2,133	2,397
F17 313—Sys analysis U/sea W/F	1,944	2,226	2,281
F17 319—Vlap	1,425	1,540	
F17 321—U/S weapons struc and flu dyn	1,319	1,447	1,454
F17 323—Unguid weapons struc and balstic	579	489	1,831
F17 331—Undsea weapons propulsion	2,334	1,859	2,462
F17 341—Undsea weapons guid and control	8,014	7,310	7,767
F17 342—Anti-air weapons guid and control	869	870	927
F17 343—Anti-surf guid and control	581	591	550
F17 344—Multipur weapons guide and control	696	603	635
F17 351—Undsea weapons warhead and fuzes	1,505	1,837	1,864
F17 352—Anti-air warheads and fuzes	135	146	186
F17 353—Anti-surf warheads and fuzes	3,935	4,189	4,264
F17 354—Explos research and safety	1,038	1,559	1,620
F17 361—Submarine weapons launching		492	,185
F17 362—Surf weapons launch/hand/serv	90		
F17 363—Air weapons launch/hand/serv	209	123	145
F17 380—Special effects technology	250		712
F17 381—Psychophysical weapons and dev	135	50	55
F17 382—Directed energy weapons and dev		290	2,245
F17 383—Weapons energy sources		1,354	1,337
F19 332—Solid propulsion	4,296	4,910	4,545
F19 333—Liquid and hybrid propulsion	735	758	375
F19 334—Air breathing propulsion	4,129	6,178	5,959
F20 311—Systems anal strike W/F (guided missiles)	2,200	2,395	2,019
F20 322—Guid miss struc and flu dyn (guided missiles)	1,610	2,090	2,466
F20 342—Anti-air weapons guid and control (guided missiles)	2,936	3,243	4,191
F20 343—Anti-surf guid and control (guided missiles)	1,999	1,833	1,357
F20 344—Multipur weapons guid and control (guided missiles)	1,659	2,299	2,007
F20 352—Anti-air warheads and fuzes (guided missiles)	1,717	1,969	2,355
F20 354—Explos research and safety (guided missiles)	511		
F20 362—Surf weapons launch/hand/serv (guided missiles)	621	252	252
F20 363—Air weapons launch/hand/serv (guided missiles)	925	861	1,907
F23 372—Aero/surf target CM and dcpt	4,303	4,044	4,560
F26 311—Systems anal strike W/F	233	203	205
F26 371—Undsea target CM and deceptn	2,259	3,103	2,888
F27 371—Undsea target CM and deceptn	1,894	2,166	1,970
F27 373—Udt/eod equip and techniques	806	1,027	1,190
F41 311—Systems anal strike W/F	129	65	65
F50 311—Systems anal strike W/F (Marine Corps)	359	774	567
F50 323—Unguided weapons structures (Marine Corps)		732	603
F50 343—Anti-surface guidance (Marine Corps)	1,225	802	1,105
F50 353—Anti-surface warheads/fuze (Marine Corps)	275	913	1,606
Total	62,574	71,029	77,242

Senator YOUNG. The $77.2 million you are requesting for fiscal year 1973 is an increase of $6.2 million over the sum provided for fiscal year 1972. Would you tell us why you need this increase?

Admiral DAVIES. Most of the planned increase in funding in fiscal year 1973 is assignable to new or expanded effort in Navy gun technology. After being virtually eclipsed by other weapons for 30 years, the naval gun is emerging as a very serious contender to serve once again, in an important role. Little research and development on guns has been performed since World War II—indeed it once seemed that little more could be done. But now, due largely to the successes in the competing guided missile, new gun concepts are emerging, building largely on missile technology, that may substantially change the picture. In a number of our projects we will initiate or expand work directed to improving gunfire effectiveness through improved accuracy, increased range capability, shortened time of projectile flight, better fuzing, greater projectile lethality, and higher rates of fire. Additionally, we will be working to substantially reduce the weight of our guns while at the same time improving their logistic and reliability situations.

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Chairman ELLENDER. Of the total requested for Weaponry Technology, $7.8 million is for the project entitled "Undersea Weapons Guidance and Control." Give us a brief, unclassified description of this project and tell us what you plan to do with the funds you are requesting for fiscal year 1973.

Admiral DAVIES. I will be happy to. The goal of the project, Undersea Weapon Guidance and Control, is to provide torpedo homing systems which will satisfy the requirements established by the threat of the future. There are two main programs in progress to design, construct and evaluate experimental hardware versions of a type of sonar and data processor which cannot be fitted into a torpedo with current technology. One of these experimental hardware systems, designed to fit in the air-dropped size weapon, will be packaged in a torpedo vehicle during fiscal year 1973. Final exploratory development test and evaluation of the design concept will be undertaken. The second system is designed for the larger submarine-launched torpedo. The sonar portion of this experimental hardware will be packaged in a torpedo vehicle. A program of in-water experiments has been scheduled. These experiments will provide data to refine the sonar design and complete the guidance and control system design. A smaller exploratory development program of a simple but reliable hardware version of an antisurface ship homing system will be completed. This will include in-water runs against real targets to demonstrate the systems capabilities. Simulation facilities will be used extensively to test and evaluate system designs operating in hostile environments, and to provide data for design refinements. Although simulation provides a reliable and relatively inexpensive method of evaluating systems, it cannot completely replace in-water tests with complete systems. For reasons of safety and economy, real submarine targets cannot always be used for these tests. A vehicle which realistically simulates a real submarine target to the advanced torpedo sonars will be employed in a series of field tests.

Effort will continue in the area of fire control to obtain and utilize the inputs from current and projected sonars as well as inputs regarding the state of the in-situ ocean environment to establish and implement the best mode of operation for the weapons systems under development.

Chairman ELLENDER. $4.3 million is requested for the project entitled "Anti-Surface Warheads and Fuzes." Give us a brief, unclassified description of this project and tell us what you hope to accomplish with the funds you are requesting for fiscal year 1973.

Admiral DAVIES. Yes, sir. The exploratory development program on antisurface warheads and fuzes addresses itself to generating a technology base for developing superior conventional nonnuclear and nonchemical ordnance for use against surface targets found anywhere in the world. The technical effort performed relates to free fall weapons, guided weapons, unguided rockets, and projectiles. The work makes possible the necessary updating of our weapons to stay ahead or at the least keep pace with those of our potential enemies. Our conventional weaponry must change as our target importance and target spectrum changes. There is no question that the missile firing small boat and the growing strength of the Soviet Fleet influences our future weaponry. More effective antiship ordnance is receiving priority attention in this project.

The vulnerability of ship targets to existing and advanced weapon concepts is determined by analyses and tests under the antisurface warhead and fuze efforts. New high performance aircraft have obsoleted some weapons, and degraded others creating deficiencies in our conventional capability. Making room for missiles, guns, and other armament aboard our crowded ships have demanded smaller, lighter weight weapons without loss in weapon lethality. Weapon fuze efforts involves application of the new solid state electronics technology and laser technology to solve problems of fuzing in adverse environments, fuzing reliability, fuzing costs, and fuzing flexibility. New kill mechanisms, improvements of the old ones, and the combination of two or more mechanisms are explored to make our future weapons more effective. Weapon safety investigations such as cook-off resistant ordnance insures the survivability of our carriers and other ships in the event of a fire. Interdiction terrain denial weapon concepts are investigated for deep interdiction missions. Large caliber aircraft guns are being explored for their potential accuracy and lethality. Foreign ordnance technology is investigated for Navy weapon applications.

Senator YOUNG. You are requesting $4.6 million for the project entitled "Missile Solid Propulsion." Comment on this project.

Admiral DAVIES. Future Navy weapons will require increases in speed range, maneuverability, and are usually volume limited. These system needs are heavily dependent on increases in missile motor performance often with new capabilities not heretofore required. This work is underway in new propellant formulation and evaluation including gun propellants, gun launched rockets, new motor design concepts including propulsion steering, throttleability, development of new motor materials for chambers, liners, and nozzles. The work is strongly oriented toward the specific technology needs of future systems.

A major effort is underway in propulsion steering to [deleted].

Chairman ELLENDER. You are requesting $6 million for the project entitled "air breathing propulsion (missiles)." Please comment on this project.

Admiral DAVIES. Yes, sir. Future Navy missiles, usually volume limited, will require major increases in range and/or payload weight, and maneuverability which will be largely dependent on the engine performance. The family of [deleted].

Senator YOUNG. What other Government agencies have programs in this field, and how are they coordinated with those of the Navy?

Admiral DAVIES. Work in this area is also being conducted by Army, Air Force, and NASA. These exploratory development programs are coordinated by the Joint Army-Navy-NASA-Air Force (JANNAF) Interagency Chemical Rocket Propulsion Group consisting of the technical program managers from the Naval Air Systems and Naval Ordnance Systems Commands, Army, NASA, and the Air Force and the D.D.R. & E. This JANNAF group meets regularly for program coordination, technical symposia, and sponsors panels of government/industry experts in key problem areas. Dissemination of technical information is through the DOD-sponsored Chemical Propulsion Information Agency at the Applied Physics Laboratory, Johns Hopkins University in Silver Spring, Md.

Senator YOUNG. What will you do with the $6 million you are requesting for fiscal year 1973?

Admiral DAVIES. [Deleted.]

Chairman ELLENDER. $4.2 million is requested for antiair weapons guidance and control (missiles). Has the committee been provided with full details on this project?

Admiral DAVIES. Yes, sir. I would note, with respect to your earlier question regarding the need for an increase in weaponry technology, that a new task funded in at a level of $1 million will be initiated to pursue projectile guidance technology in this project. This accounts for the fiscal year 1973 increase in the project over the previous fiscal year.

Chairman ELLENDER. $4.6 million is for the project entitled "aerospace/surface target countermeasures and deception." Give us a brief, unclassified description of this project and tell us what you plan to do with the funds you are requesting.

Admiral DAVIES. I will be happy to. The objective of this project is to investigate, analyze, and develop radio, radar, and electro-optical countermeasures techniques which can degrade the performance of enemy surveillance, weapon control, communication, and missile guidance equipments and systems. Even incremental improvements [deleted]. The frequency ranges of interest can range from radio broadcast frequencies through the visual optical frequencies. [Deleted.]

Chairman ELLENDER. Why do you need the increase of some $500,000 you are requesting for fiscal year 1973?

Admiral DAVIES. [Deleted.] The aim is to provide techniques which will eventually lead to the most cost-effective electronic countermeasures equipments and systems that can be placed on U.S. Navy ships and airborne platforms. These electronic countermeasures devices will provide a most essential tactical means of confusing enemy forces regarding the location, size, and disposition of U.S. Navy Forces.

NAVAL VEHICLE TECHNOLOGY

Chairman ELLENDER. Of the total requested for Other Equipment, $41 million is for a program entitled "Naval Vehicle Technology". Can you give us an unclassified description of the objectives of this program?

Admiral DAVIES. Naval vehicles are defined as those self-propelled, boosted or towed conveyances used for the strategic and tactical deployment of forces, weapons, materials and supplies in support of naval warfare. Projects within this program element are limited to those in which the principal objective is to provide the necessary understanding and application of following technologies to Navy and Marine Corps aircraft, ships, submarines, boats and amphibians.

The technologies embraced in the Naval vehicle program element include weapon systems analysis, fluid dynamics, structures, vehicle control, electrical energy conversion, main propulsion systems (nonnuclear), auxiliary equipment, installed provisions for crew safety and escape, vehicle noise and signature reduction, and vehicle handling/servicing equipment. The work includes system, subsystem, and component analysis and design plus testing and small hardware developments.

The essential objective of the effort in this element is to provide the necessary understanding and application of the above technologies to future aircraft, ships and submarines for the U.S. Navy.

Chairman ELLENDER. Please provide for the record a tabulation listing the projects to be funded, the amounts for each fiscal years 1971 and 1972, and the request for fiscal year 1973.

Admiral DAVIES. I will be glad to do so.

(The information follows:)

Funding by Fiscal Year

[In thousands of dollars]

	1971	1972	1973
FXX 411—Nsap 2	1,019	1,297	2,830
F26 453—Mag and electromag silencing	200	22	244
F27 453—Mag and electromag silencing	169	387	287
F32 411—System analysis	2,356	2,895	1,985
F32 421—Fluid dynamics	2,052	2,422	2,327
F32 422—Sturctural design and test	2,418	2,559	5,350
F32 423—Vehicle control	2,205	2,580	2,118
F32 431—Elec energy conver/distrb	918	932	941
F32 432—Main prop eng/turb/rel tech	2,779	3,136	3,045
F32 433—Aux machinery/equipment	1,044	1,343	1,443
F32 451—Habt/pers protect/damcntrl	1,465	1,904	1,780
F32 452—Acoustic silencing	95		
F32 453—Mag and electromag silencing	240	220	245
F32 461—Vehicle handling/servicing	2,117	2,296	2,298
F35 411—System analysis	1,362	1,247	1,417
F35 419—Vlap	1,425	1,540	
F35 421—Fluid dynamics	2,518	3,010	2,179
F35 422—Structural design and test	3,076	4,305	5,487
F35 423—Vehicle control	135	209	200
F35 431—Elec energy conver/distrb	834	825	803
F35 432—Main prop eng/turb/reltech	1,576	1,736	1,897
F35 433—Aux machinery/equipment	861	973	973
F35 451—Habt/Pers protect/damcntrl	70	110	102
F35 452—Acoustic silencing	2,699	3,017	2,907
F38 451—Habt/pers protect/damcntrl	239	271	273
F48 411—Systems analysis	100		
Totals	33,972	39,236	41,131

Chairman ELLENDER. I note that $5.4 million is for a project entitled "Structural Design and Test (Aircraft)." Please describe the objectives of this program and tell us why you need the substantial increase of $2.8 million you are requesting.

Admiral DAVIES. This project covers the development of advanced structures required for future naval aircraft and helicopters and of the structural design and testing technology upon which reliable structures of these types must be based. The principal application areas are aircraft airframes and helicopter airframes and rotor blades. Major objectives toward which the work is directed are light weight, reliability, long service life, low cost and ease in fabrication repair and maintenance and the ability to withstand damage in the combat environment. A major part of this project is the establishment, through development of testing techniques and measurement of the loads experienced by Naval aeronautical vehicles in service and the evaluation technology required to be able to predict accurately the service performance of specific structures and structural components.

[Deleted]. The overriding emphasis in the fiscal year 1973 program will be on weight saving in order to provide the support vital to construction of VTOL aircraft of the future. A key element in the approaches to be used will be exploitation of new materials and new methods of construction. Although not so dramatic as construction and demonstration of hardware elements, the vital design technology in joints, cut-outs, removable panels, repair techniques, and determinations of enviromental resistance will not be neglected.

Senator YOUNG. I note in the descriptive summary reference to a joint United States/United Kingdom/Canada flight program. Please identify this project on the project listing and tell us what sort of arrangements exist for funding this joint project.

Admiral DAVIES. This is a task under Project F32 423, Vehicle Control.

A memorandum of understanding (MOU) has been negotiated with representatives of the Governments of Canada and the United Kingdom to investigate the potential of V/STOL aircraft to achieve an instrument flight capability in an operational context by defining the requirements for control, display, and guidance parameters under both IFR and VFR conditions. The MOU covers the installation and flight evaluation of the electronic display system in a CL-84 V/STOL aircraft. The planned program provides for approximately 100 hours of flight test at the NATC, Patuxent River, Md., over a 12-month period, beginning October 1972. The MOU commits the U.S. Navy to an expenditure of $700,000 of fiscal years 1972 and 1973 exploratory development funds. The Canadian share of the cost is $1 million and United Kingdom's is $600,000.

This program will provide essential data on display/control requirements for operating V/STOL aircraft in confined areas such as a sea control ship. Through this cooperative effort the cost of the program to each participating Government can be minimized.

Chairman ELLENDER. $3.1 million is for the project entitled "main propulsion engines, turbines, and related technology (aircraft)." Can you give us a brief, unclassified description of this project and tell us what you hope to accomplish in fiscal year 1973 with the funds you are requesting?

Admiral DAVIES. This project supports the development of advanced main aircraft propulsion systems and related components. Specifically, the project encompasses component development for high temperature engines, advanced lift engines, composite engines for the high-speed flight regime, and advanced augmentation systems. Advanced materials and superalloy applications are evaluated and advanced trnsmission concepts are being investigated. [Deleted.]

Chairman ELLENDER. $5.5 million is for the project entitled "structural design and test (ships)." What are the objectives of this project?

Admiral DAVIES. The objectives of this project are the exploration and development of advanced, reliable methods for designing surface ship and submarine structures to withstand loads imparted throughout the ship service period by the sea and weapons attack. The requirement for improved characteristics for future hydro-vehicles, such as: deep depths, lighter weight, greater speeds, less noise, greater degree of maneuverability, and reduced frequency of maintenance inspection or repair, are expected to continue. These desired characteristics, coupled with improved weapons being developed by potential enemies, no longer permit an empirical approach to surface ship and submarine hull design. Further, to provide these desired characteristics, new materials with higher strength-to-weight ratios and improved structural configurations must be utilized thereby requiring the development of reliable theories for prediction of the loads applied to the ship hull, and structural response through the development of new structural analytical techniques and their validation by model tests.

Senator YOUNG. I note some work is being carried on with HY130 steel. What relationship has this work to the project on HY130 steel that we discussed earlier?

Admiral DAVIES. The work in this project concerns fundamental aspects of ship structural concepts and HY130 steel is one of the materials used incidentally because its strength properties fall into the range needed for the tests. The thrust of this work is toward structures and their modes of failure. [Deleted.]

Chairman ELLENDER. Why do you need the increase of $1.2 million you are requesting?

Admiral DAVIES. The increase is needed to investigate the response of catamaran bridge cross-structure to whipping and torsional loading and to correlate predictions with test results to be obtained from instrumented ship structural trials on Navy catamarans, this work to be done as a new initiative.

SUPPORT TECHNOLOGY

Chairman ELLENDER. $88 million is for a program entitled "Support Technology." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

SUPPORT TECHNOLOGY

Description.—Supports exploratory development directed towards the protection and improvement of the physical and mental effectiveness of Navy and Marine Corps personnel under all circumstances and in all environments in which Naval operations are conducted. Develops technology in the four major environmental areas in which naval equipment and systems operate; the atmosphere, the oceans, the amphibious/ashore, and the nuclear warfare environment. This encompasses weather observation, forecasting and modification, physical, chemical and biological characteristics of the deep ocean areas as they apply to underwater acoustics and the development of simulation models, damage data, and hardening techniques for protection from the effects of the electromagnetic pulse. Provides support for the development of improved technology for overall logistic and engineering support for Naval and Marine Corps systems and includes such areas as environmental protection, electromagnetic compatibility, and deep ocean and amphibious engineering. In the area of structural, functional, and electronic materials and components, this program element supports the development of new metallics, non-metallics, organics, composites, microelectronics, microminiaturization and microwave devices for application in air and sea-based naval weapon systems. Efforts are also directed in the area of personnel management including personnel selection, retention, and distribution, the development of techniques which maximize learning retention and transfer and the integration of simulation and training technologies. Finally the element supports efforts directed towards detection and warning systems for chemical/biological agents, techniques for personnel protection against chemical/biological and the determination of Navy chemical/biological defense needs through operational analysis.

Fiscal year 1972 programs:

a. *Life Sciences:*

(1) Continue studies predictive of emotional adjustment, psychiatric illness, and general health changes in naval service personnel; identify human limitations and capabilities in sensing, perceptual, psychomotor, and information processing behavior under extended operations and varied environments; develop improved methods, procedures, and criteria for selection of personnel for naval service and to enhance job performance.

(2) New initiatives and accelerations in 1972 include the investigation of heat and cold acclimatization as they affect Marine Corps personnel and Navy divers as a selection factor for tropical and diving duty, permitting rapid and long

range assessment of biomedical data in heat/cold stress monitoring, prevention, and therapy; establishing criteria for tolerance of patients and medical equipment to vibration/slam in newly designed high speed sea vehicles to determine suitability for use in medical evacuation; evaluation of biological effects of electromagnetic (non-ionizing) radiation with primary emphasis on effects of high frequency and extremely low frequency radiation, an area that is currently little understood; treatment on homorrhagic and septic shock with focus on the prevention of shock induced by infection following injury in combat casualties; improving the viability assay methods in the recovery of tissues and organs after long-term storage for use in treatment of battle casualties.

(3) Continue studies of factors in oral infections with emphasis in development of vaccines and anti-biological materials to prevent dental caries as a part of the Navy Dental Health Program; continue the identification and development of methods of prevention of infectious agents producing acute respiratory disease as a leading cause of time lost in the naval service; continue the longitudinal health study of submarine personnel to determine the effects of extended and prolonged duty in this environment.

(4) In diving medicine, studies are being conducted to determine safe depth and time limit for human exposure underwater; the mechanics of respiration at deep depths to determine whether respirating gas exchange is a limiting factor in deep diving; to determine effects of mixed gas in deep submergence exposure upon neuromuscular function and muscle fatigue; to gather data on the incidence of bone necrosis and its potential as a safety factor in Navy diving; and continue the computer analysis of decompression schedules.

b. *Environmental support:*

(1) *Solar Radiation (SOLRAD):* "New initiatives" in the SOLRAD project makes it possible to transform this project from a single low altitude solar research satellite to a system of high altitude orbit (70,000 nautical miles) space environment monitoring satellites, SOLRAD–11. The program provides for procurement of long-lead time items and design, development and fabrication of sensor packages and selected spacecraft subsystems for SOLRAD–11 [deleted]. Also included is the operation of SOLRAD–10 satellite.

(2) *Meteorology:* Development of techniques for Mediterranean area operational weather forecasts will continue and the development of Seven Day Tropical Cyclone Forecasts for Southeast Asia and the South China Sea will commence. Techniques for predicting the genesis, development, travel, and intensity of typhoons is continuing. An existing model of the Automatic Weather Station AN/SMQ–8 will be converted for use in extreme cold weather. Plans will be formulated for its interface with a radioisotopic nuclear power device and the protective enclosure so that reliable power is ensured at temperatures less than minus 40 degrees. The Naval Avionics Facility will accelerate the development of the Tactical Meteorological Buoy. Initially, buoys designed for test will lack a wind measuring capability. A suitable wind sensor is under continuing development. The Environmental Prediction Research Facility will continue development of warm-fog and warm-cloud models and test their validity in conjunction with modification experiments performed by the Naval Weapons Center. The Naval Weapons Center will continue investigations for improved seeding agents, particularly for dispersal of warm fog, and for a better understanding of nucleation processes. The chemical and physical properties of ammonium nitrate-urea-water solution is being studied to gain an insight as to how it performs as a warm fog seeding agent.

(3) *Oceanography:* Experiments are being conducted to delineate which fracture zones in the Atlantic Ridge act as acoustic windows. Airborne magnetic reconnaissance of the Oceanographer Fracture Zone are underway to evaluate the technique of "magnetic-bathymetry" to delineate unknown acoustic-bathymetric windows in poorly charted areas. An experiment on the propagation of sound in shallow ocean water will be conducted at several sites in the Gulf of Mexico. The objective is to test acoustic wave and scattering theory in diverse ocean areas. The theoretical model used to predict propagation characteristics is being improved and extended to accommodate more complex environmental conditions. Computer simulation tests of a model for predicting the effects of sedimentary layering in the sea floor will be completed this year. [Deleted.] The Arctic Pool overhaul will be completed and experiments conducted simulating break through of sea-ice by submarine sails. Emphasis will be placed on developing a biological reverberation prediction model for the Mediterranean. An extensive acoustic and biological field measurement program will be undertaken during February and March to examine seasonal differences between winter and

previously collected summer data. Acoustic volume scattering measurements will be made to determine integrated scattering strengths and scattering strength versus depth, both as a function of frequency. [Deleted.]

(4) *Nuclear Warfare:* A report on the distribution and history of temperature in circular cylinders exposed to the thermal radiation pulse of a nuclear detonation will be published. In the Transient Radiation Effects on Electronics (TREE) area, methodology will be developed to assess susceptibility of circuits/subsystems by computer assisted analysis with verification by radiation testing. A preliminary report on Naval Tactical Data System and R–1051 receiver susceptibility to nuclear radiation will be prepared. A parametric study of combined thermal radiation, air blast and effects on plates and beams with varying weapon yields and stand-off distances will be completed. Nuclear information in "Allied Naval Maneuvering Instruction" and "Anti-Ship Missile/Defense" will be updated.

c. *Materiel support:*

(1) Universal interface equipment to provide precise time to additional users will be developed. Selected communication, navigation and identification systems will be modified to demonstrate advantages of dissemination/synchronization capabilities with one microsecond precision.

(2) The electromagnetic compatibility program will address failure modes and mechanisms in solid state devices to provide electromagnetically "hardened" devices. Design guides and specifications will be updated to improve compatibility of operational systems.

(3) Work on the Navy Environmental Protection Program will be continued. Efforts to develop equipment and techniques to eliminate known Navy sources of pollution will be expanded. Emphasis will continue on methods of handling oily bilge and ballast water, ship sanitary sewage, ship solid waste, and obsolete ordnance. Work on the new initiative to establish a data base for pollution control will be accelerated with a view to completion in FY 73.

(4) Will participate in the Department of Defense project on the development of containerized distribution systems.

(5) Continue the development of a methodology for establishing the cost effectiveness of fire protection for shore facilities.

(6) Initiate development of standardized hardware components between the Amphibious Assault Bulk Fuel System and the Tactical Airfield Fuel Dispensing System to provide storage and a fuel distribution system to meet Marine Corps requirements.

(7) Initiate development of a family of interlocking fiberglass reinforced plastic panels which can be integrated into protective structures for Marine Corps ammunition storage, petroleum, oil, lubricants, and aircraft at forward sites.

d. *Materials and components:*

(1) In the new initiative area for combatant submarine hull construction, develop data so that an early decision can be made between two candidate materials, [deleted]. This development will provide the submarine hull material for future deep diving submarines.

(2) In the new initiative effort in reentry vehicle materials, developments have been initiated [deleted].

(3) In the electronic device new initiative area, efforts are concentrated on the development of a 500–1000 watt, 30–500 HMz hybrid electron beam semiconductor amplifier device. Achievement of this wide range and high power will provide the basis for increased efficiencies in electronic systems.

(4) Complete development of techniques for applying highly dense ceramics as an integral surface layer on reinforced plastics to improve radome and antenna window rain erosion resistance.

(5) Complete development of a strippable water sealant for use on power machinery conductors aboard ship. Time to make-up cable ends, and time required for maintenance of conductor wires will be greatly shortened. Initiate development of a light weight shielded cable suitable for hydrofoil type ship application.

e. *Personnel support:*

(1) Initiate the program recommended by the Navy Research Advisory Committee to solve the problems of recruiting, training and retaining the type of personnel required to run an effective "All Volunteer Navy" in the "Zero Draft" environment.

(2) Complete three specialized computer models (Sea/Shore Rotation, Sea Tour Patterns and Rotation Simulation). The use of these models will decrease transfer costs and increase morale and retention.

(3) Complete determination of enlisted aircrew positions which require special skills and extensive training and devise new rating structure concepts to solve the problems of obtaining and retaining qualified aircrew personnel.

(4) Complete development of carrier landing training model to establish feasibility of using holographic and optical techniques as an effective solution to carrier landing training problems.

(5) Initiate adaptation of wide angle TV pinhole camera to the problem of visual simulation for tank operator training for the Marine Corps.

(6) Determine feasibility of a controllable sonar training vehicle suitable for training Navy sonarmen while at sea. The sonar task requires continuous practice in order to maintain the required skill level.

(7) Develop analytic procedures and documentation requirements for evaluating "personnel feasibility" of proposed Navy systems to ensure that all new systems will be fully operable in view of projected manpower and personnel restraints.

(8) Initiate work on improvement of instruction available for the Marine Corps Amphibious Warfare extension course of the Continuous Officer Professional Education (COPE) program to make it as effective as the resident Amphibious Warfare School instruction.

f. *Chemical/Biological weapons defense:*

(1) A correlation of the Biological and Chemical decontamination effects of the Activated Sodium Hypochlorite/Self Limiting Activated Sodium Hypochlorite (ASH/SLASH) system will be conducted. This will provide the Fleet a total decontamination capability with a minimum of variations, and adjustments for different agents and conditions.

(2) A breadboard [deleted] detection system will be constructed. This will, if successful, enhance the capability to detect at-sea bio-chemical attacks at horizon ranges.

(3) Evaluation will be made of a concept to utilize a modified optimum ship routing system, (Optimum Wind Ship Routing) to provide best ship track to minimize the effects of Chemical/Biological attacks.

Fiscal year 1973 planned programs:

a. *Life sciences:*

(1) Studies of fleet personnel effectiveness in unusually stressful occupations, stress related health change, and first enlistment adjustment to varied naval service duty will continue with increased emphasis on biochemical factors as well as motivational indications of stress tolerance of personnel and the relation between physical and mental fitness for duty in different naval enviroment; initiate new studies in aviation sleep/work/rest cycles and accelerate the evaluation of data collected in performance of air and ground crew personnel for use in developing preventive measures to operational stresses and treatment of health impairment among aircrewmen.

(2) Continue development of criteria in heat/cold acclimatization and commence construction and validation of acclimatization tables as an aid to decreasing heat casualties in fleet, amphibious and field operations; in non-ionizing radiation protection, consideration will be given to initiating exposure tests of microwave and extremely low frequencies to human volunteers, with emphasis on fatigue, performance, decision making and mood as well as physiological parameters; patient evacuation in new high speed landing craft will be simulated in tests of the effects of landing craft motion on animals with hemolytic shock; conduct preliminary trials of newly developed agents for prevention of dental caries. Adapt viability assay for long term stored tissue to possible clinical use and complete development of an automated, rapid tissue typing system in support of fleet and field operations; complete the definition of changes in abnormal shock states in battle casualties, both hemorrhagic and septic, with possible clinical application of patho-physiological factors elucidated; continue development of preventive measures in the control and treatment of disease in Navy and Marine Corps personnel; continue definition of epidemiological disease hazards and complete development of toxicity standards of ultra-low volume insecticides for use at Navy and Marine Corps installations.

(3) In diving medicine, continue studies of environmental diving stresses and the physiologic limits of diving exposure; in diving safety, major expanded

effort is projected in the areas of a septic bone necrosis as a potential disabling and crippling disease in divers and high pressure nervous syndrome (Helium tremor) as a depth limiting factor in naval diving, with primary emphasis on the development of prophylactic techniques, as well as the treatment of the disease entities themselves; six prototype bubble detectors (monitors) will be used in designing automatic decompression systems for chambers and habitats utilizing real time feedback in determining rate of decompression of divers, permitting evaluation of decompression tables in relationship to the real time evaluation of the diver undergoing decompression; evaluate self-regulating methods (e.g., control of heart-rate, brain waves, respiration) to maintain and increase performance efficiency of divers.

b. *Environmental support:*

(1) *Solar Radiation (SOLRAD):* SOLRAD 9 and 10 will continue to be monitored and data forwarded to operational users. Design and fabrication of SOLRAD–11 will continue. SOLRAD–11 will be phased into Advanced Development in FY 74.

(2) *Meteorology:* The Naval Air Development Center, will determine the feasibility/techniques for converting an Anti-Submarine Warfare Sonobuoy to a meteorological dropsonde for use on the WP–3A weather reconnaissance aircraft since the capability of obtaining meteorological data below aircraft flight level will be lost when the existing stock of AN/AMT–6 dropsondes is depleted. A prototype weather display and presentation system which will permit logical and systematic display of environmental data at Navy/Marine Corps forecaster level will be completed. Developments for forecasting of sensible weather for the Mediterranean and a seven day typhoon forecast model for the Pacific will continue. A completely converted AN/SMQ–8 weather station will be married with its nuclear power source and protective enclosure (thermal igloo) for a sustained cold weather test in an environmental chamber. Preliminary specifications will be written for commercial procurement. Studies related to the mechanism of ice nucleation by solid nuclei will be completed. Studies related to warm fog generation and dispersal will continue.

(3) *Oceanography:* Emphasis will be placed on the final processing of the Mediterranean acoustic and environmental data. Specific plans call for the synthesis of the two seasons of volume scattering data collected in the Mediterranean Sea for the final development of biological reverberation prediction model taking into account temporal, geographic, frequency and depth variations. Noise data gathered during FY 71 and 72 will be analyzed to study sound pressure levels as a function of averaging time and averaging bandwidth over the frequencies of interest. [Deleted.]

[Deleted.] More objective ice data gathering, including infrared interpretational and analytical techniques, will be provided toward the accelerated submarine arctic transit and underice test program. Full scale tests to determine the degree of relationship, on meso- and microscales, between the top and bottom sides of the ice will be conducted. Scale model target strength studies will be conducted. The target strength of submarines before and after hull modifications will be made to access effectiveness of target strength reduction techniques. Target strength prediction model will be modified to account for vertical aspect dependence of target strength as dictated by field measurements. Target strength and coherence measurements of nuclear submarine hulls will be reported. The results of this work will aid active sonar designers to determine operational range predictions. The shallow water normal mode propagation loss models will be validated by collecting data using normal mode array at sites other than Block Island/Fishers Island Range. A surface reflection model which is valid for larger grazing angles than Marsh, Schulkin and Kneal model will be developed, and an improved model of Reliable Acoustic Path (RAP) Propagation in Arctic waters will be completed. Underwater communications technology will benefit from the work being conducted in this project. A raliable no-moving part low threshold/high sensitivity current meter, capable of both shallow and deep water applications will be developed. During FY 73 tests on the breadboard remote operating meter will be completed and fabrication and testing of a self-contained current meter initiated. This task will provide the Navy with a reliable current meter, designed specifically for shallow water current measurements to support mine warfare, harbor defense, amphibious warfare, and deep ocean surveys. A program will be initiated in Very Low Frequency acoustics to determine the potential of this frequency range for applications in underwater surveillance. Propagation modes, attenuation factors and ambient noise characteristics will be investigated.

(4) Nuclear Warfare: In the Transient Radiation Effects on Electronics (TREE) area, effort will continue in the development of computer techniques whereby systems can be analyzed as complete systems rather than as a combination of subassemblies. Hardening methods if required will be developed and evaluated. Manuals and guidelines outlining vulnerability assessment techniques and hardening methods for sensitive and critical shipboard electronic systems will be prepared by June 1973.In the thermal air blast effort, the draft of a manual giving environment, material properties and design information applicable to the problem of hardening against nuclear weapon thermal radiation effects will be issued.

c. *Materiel support:*

(1) *Environmental Protection:* Efforts will be expanded to accommodate exploring approaches identified in prior years. The ship waste program is expected to move near time frame methods of waste treatment into operational use. A small scale markup of an integrated waste management system will be completed and testing initiated. Ordnance reclamation investgations are expected to reach full maturity with some prototypes moving to Advanced Development or Military Construction.

In an efforts to further optimize Navy methods of ordnance disposal or reclamation additional technologies will be investigated for recovering ingredients for reuse; scale up and safety tests of producing methods will be developed and the economies of alternates will be examined. A significant FY 73 expansion of the ordnance reclamation program is expected to address basic design of ordnance to simplify reclamation. The environmental protection data base effort is expected to complete establishment of routine procedures within the Navy to gather data to confirm compliance with all laws and regulations relating to environmental protection. Technology will be pursued or developed to solve specific pollution problems from naval operations and shore facilities as they are identified. A prototype 100% photographic materials silver recovery plant is expected to be ready for testing.

(2) *Precise Time Technology:* To reap the benefits of precise time and time interval, it is necessary to provide a coordinated system which is referenced to the Department of Defense Standard at the U. S. Naval Observatory in a manner which is economically feasible, operationally compatible and which will not increase the vulnerability of the user systems. The precise time transfer or distribution system must itself be as invulnerable as possible. Long base line interferometry experiments previously delayed due to funding limitation will be conducted to determine the feasibility of using this technique to achieve an invulnerable source of precise time in space.

(3) *Life Cycle Costing:* Studies aligning reliability, maintainability, and final system effectiveness for generalized systems will be completed and the effort transferred to specific future systems. Failure mode analysis and investigation of optimum quality assurance for reliability will continue. Experience gained in application of the General Effectiveness Model to Underwater Long-range Missile Systems will be reviewed.

(4) *Electromagnetic Compatibility:* This area will continue to receive emphasis. Techniques of time sharing and precise control to eliminate interference and integrated naval electronic systems will be pursued. Hardware improvements, system revisions, circuit discipline procedures will be implemented to reverse the trend toward electromagnetic confusion.

(5) *Material Flow Technology* will pursue tradeoffs between prototype methods of handling containers. Systems candidate will be formulated to permit examination of total system concepts for logistic support of Marine Assault Forces or forward fleet elements from commercial shipping.

(6) *Marine Corps Combat Engineering* support technology will continue with evaluating assault fuel systems, protective structures, and marginal terrain aids. A significant FY 73 initiative in this area will have twofold technical goals, i.e., (a) the development of the Marine Corps Vertical/Short Take Off and Landing (V/STOL) aircraft support system concepts and associated operational techniques and (b) the systems engineering approach to problem analyses of V/STOL aircraft turnaround and other support operations and optimal integration of systems, operations and techniques. Problem areas covered in the support system concepts development include: debris suppression to prevent ingestion of foreign objects during landing and take-off operations at austere forward sites, development of lightweight, temperature resistant matting or other feasible surfaces for landing pads, short runways and parking areas; noise suppression and hold down

techniques for engine run-ups at forward sites and facilities; aircraft camouflage in operational environments and shelters for crews and maintenance operations; methods for providing special materials such as distilled water and liquid oxygen supply; methods for providing crash, fire and rescue capability, aviation ordnance packaging and storage; rapid, easily erected, aircraft revetment provisions; simple lightweight, fuel transport and storage methods; and rapid materials repair kits for matting and shelters. Turnaround requirements will be developed in consideration of: mission demands; aircraft types and mix; manpower and skill constraints; maintenance and logistics concepts; flexibility required; and environmental constraints. Conceptual design and definition of support systems and techniques will make use of industrialization potentials and novel ground handling concepts. All-weather, high-volume-traffic Vertical/Short Take Off and Landing (V/STOL) launch and recovery capabilities being developed under other Task Areas for Navy seabased operation will be applied as appropriate for the Marine Corps operations. This task initiates consolidation of work started in previous FY's under other Task Areas. [Deleted.]

d. *Materials and components:*

(1) The physical metallurgical properties of [deleted] will be determined. Comparative analysis of the developmental risks, system application pay-offs, and economical and practical considerations will be made, and a decision reached on which metallic material to focus on for further development.

(2) Efforts on reentry vehicle materials will become more and more focused. The performance of high temperature polymer materials will be evaluated, and the properties for improved ablation performance in homogenous bulk graphite determined. Materials fabrication and processing parameters will be evaluated as they relate to heat shield, overlay and underlay construction.

(3) Electronic device and new initiative efforts will continue. Prototype development of a system packaging concept using large scale electrical connection techniques will be completed. Work on traveling wave tubes will be emphasized and work in charged couple devices will be initiated.

(4) Work will be completed on machining and grinding procedures for ceramics that will enable control of surface defects during fabrication. Controlling process parameters and their permissible variations will be identified in order to permit increased material reliability for applications. Emphasis will be directed toward fabrication of silicon nitride material for gas turbine vane applications at 2500°F.

(5) A material selection procedure based on tests and analytical investigations will be established for wire rope applications. Clear criteria for the selection, maintenance and retirement of wire rope in salvage, mine sweeping, underway replenishment, etc., will be defined.

(6) Efforts will continue on developing techniques for separating water from Navy Distillate Fuel. Methods to transfer Navy Distillate fuel at low temperatures will be determined. Studies on the storage stability and compatibility of present fuel line pump systems with the Navy Distillate fuel will be completed.

e. *Personnel support:*

(1) *Holographic Carrier Landing Simulator:* Applications of the in-house developed holographic technique, used in the carrier landing simulation technique, will be expanded to other training problems such as low altitude terrain approach, helicopter landing and maneuver and other tactical training problems.

(2) *Underwater Terrain Navigation and Reconnaissance Simulator (UTNRS):* A miniaturized sonar system, using very high frequency sound, will be developed and experimentally added to the system together with improved extra vehicular manipulators.

(3) *Sonar Training Vehicle:* A means for training Navy Sonarmen while at sea will be developed upon completion of the exploratory development model of a controllable dynamic vehicle. This vehicle will have a listening transponder to transduce a sonar query pulse; it will have the necessary electronic complement to store this pulse, to process it, and to feed an outgoing amplified pulse into an output transducer. The essential idea is that this vehicle will not only hear a query, amplify it, and re-transmit it, but that it will also be capable of processing it; by means of the up-to-date electronics within it, the answering pulse will simulate that from a much larger vehicle. Other distinguishing characteristics may be added to this outgoing signal to supply adequate training to the listening operator. By means of a self-contained memory, course information will be fed into this vehicle before launch so that a programmed cruising path may be had.

(4) *Visual Skills Training:* Implementation of the visual skills trainer in operational settings and evaluation in terms of cost versus training utility.

(5) *Machine Controlled Adaptive Training:* Results of the above will be incorporated into the in-house flight simulator facility (TRADEC) and be tested and refined for operational training use.

(6) *Forecasting Impact of New Systems on Personnel and Training Requirements:* (a) Develop analytic procedures and documentation requirements for evaluating "personnel feasibility" of proposed Navy Systems to ensure that all new systems will be fully operable in view of projected manpower and personnel constraints. (b) Evaluate revised procedures for personnel research in support of advance Shipbuilding Programs. (c) Identify major personnel and training problems in Navy undersea developments and provide recommended corrective actions.

(7) *Navy Personnel Resources Management:* (a) Complete design of broad guidelines for the formulation of career development programs for a selected sample of enlisted ratings. (b) Complete development of methodology for determining the optimum rate of return on training investment for officer and enlisted personnel.

(8) *Occupational Analysis Methodology:* (a) Pilot tests for the new concepts for Group VII ratings and develop recommendations for improved training and shipboard manpower utilization for these ratings, as appropriate. (b) Complete pilot testing the design for an Officer Occupational Analysis System. (c) Complete design of new approaches/techniques for improving job satisfaction of enlisted ratings.

(9) *Career Structures:* Complete the design of a comprehensive Electronics Career Structure for the 1975–1980 Navy.

(10) *Use of Naval Reserve and Civilian Training Personnel in Project Volunteer:* (a) Development of new personnel management concepts for relating the naval reserve to Project Volunteer. This research will provide the Navy with an improved capability for capitalizing on the trained manpower resources available in the naval reserve and in civilian skilled labor pools.

f. *Chemical/Biological weapons defense:*

(1) Design and construct breadboard [deleted] system, quantity information on living organisms, critical examination for subsequent adoption or disposal of candidate detectors, report on and discontinue microcoulometry task, standardization of Coated Latex Adsorption Method processing methods. Continue development of input for a program for the disposal at sea and on shore of chemical materials and waste to assure that the system may be detoxified and waste decontaminants rendered safe. Continue research and development on the applicability and effectiveness of present methods and materials for decon and disposal of chemical weapons and agents to enhance efficiency of present methods. Conduct research and development on promising new materials and methods for chemical weapons and agent decontamination and disposal. Investigate new chemical materials carried on ships, and various reaction products carried on ships, which because of their chemical nature, can react to give off products which require special safety procedures.

Resources (in thousands of dollars) :

R.D.T. & E.N. funds for fiscal year 1971, $62,523; fiscal year 1972, $81,756; fiscal year 1973, $87,921; additional funds to completion are continuing; and the total estimated cost is not available.

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Admiral DAVIES. I will be glad to do so.

(The information follows:)

ELEMENT CODE 6.2 (62755N)

[In thousands of dollars]

Exploratory development		Fiscal year—		
Project number	Support technology	1971 actual	1972 estimate	1973 estimate
F01-551	Atmospheric environmental support (solar radiation)	1,269	2,515	2,575
F03-532	Development engineering (electronic support)	1,029	459	469
F03-533	Electromagnetic compatibility	1,485	2,273	2,760
F05-511	Navy technological projections	425		

ELEMENT CODE 6.2 (62755N)—Continued

[In thousands of dollars]

Project number	Exploratory development Support technology	Fiscal year— 1971 actual	1972 estimate	1973 estimate
F05-512	Special laboratory support	275	297	265
F05-552	Ocean environmental support (general)	6,704	6,964	7,576
F08-551	Atmospheric environmental support (meteorology)	1,708	1,637	1,710
F08-552	Ocean environmental support (airborne)	158	180	170
F11-551	Atomspheric environmental support (shipboard instrumentation)	233	63	58
F11-552	Ocean environmental support (shipboard)	7,036	7,189	6,988
F12-523	Personnel protection and survival (marine mammals)	403	355	362
F12-524	Medical support	4,535	7,154	7,897
F12-525	Human engineering			85
F14-532	Development engineering (engineering support)	1,634	1,265	1,193
F17-525	Personnel protection/surveillance		55	55
F17-531	Material control, distribution and storage (weapons)	589	438	341
F17-532	Development engineering (weapons support)	713	537	627
F17-537	Test equipment analyses			400
F17-545	Electronic materials and components (weapons and ordnance support)	100	93	100
F17-546	Nonelectronic components (weapons and ordnance support)	2,257	2,285	2,237
F17-552	Ocean environmental support (ordnance support)	985	982	985
F17-553	Nuclear warfare environment (ordnance)	112	110	111
F26-523	Personnel protection and survival (radiation protection shipboard)	219	206	178
F26-553	Nuclear warfare environment (shipboard)	934	949	844
F27-523	Personnel protection and survival (swimmers/divers)	335	394	244
F32-523	Personnel protection and survival (aircrew)	633	737	769
F32-543	Organic materials (aircraft fuels and lubricants)	761	1,076	1,049
F35-523	Personnel protection and survival (deep ocean)	50	150	150
F35-543	Organic materials (shipboard)	283	242	288
F35-546	Nonelectronic components (shipboard)	406	443	388
F35-552	Ocean environmental support (Arctic)	396	455	448
F38-523	Personnel protection and survival (personnel protective clothing)	630	617	578
F38-531	Materiel control, distribution, and storage (logistics)	1,309	1,166	1,545
F38-534	Shore facilities support	1,337	1,103	1,096
F38-535	Deep ocean engineering	1,168	1,025	1,207
F38-536	Amphibious and advanced base technology	1,120	1,206	1,134
F38-537	Test equipment technology	981	293	446
F38-554	Environmental protection	282	6,260	5,966
F39-511	System investigations (personnel and training)	138	92	196
F39-521	Personnel management	1,241	2,681	2,979
F39-522	Personnel training (personnel)	657	556	542
F39-525	Personnel protection and survival	130	205	152
F41-522	Personnel training (training device technology)	3,769	4,054	4,103
F44-355	BW/CW [deleted] related technology	238	249	
F44-511	Systems investigations, BW/CW	222	176	
F44-561	Habitability/personnel protection/damage control	485	548	741
F44-562	Chemical safety technology	35	30	168
F48-453	Magnetic and electromagnetic silencing		100	100
F48-511	System investigation		140	53
F48-532	Development engineering and test support		84	89
F48-551	Atmospheric environmental support	235	670	798
F51-541	Metallic materials	3,448	5,237	5,732
F51-542	Inorganic nonmetallic materials	662	650	837
F51-543	Organic materials (general purpose)	2,154	2,843	2,795
F51-544	Composite materials	1,466	2,018	2,455
F51-546	Nonelectronic components (energy conversion)	50	51	51
F51-547	Reentry vehicle materials technology	362	3,109	4,523
F52-545	Electronic materials and components (general purpose)	4,377	6,468	7,399
F53-531	Materiel control, distribution and storage	120	229	370
F53-536	Combat construction facility and utility technology	240	393	544
	Total	62,523	81,756	87,921

Chairman ELLENDER. Are you requesting funds for any projects which have not been funded in prior fiscal years? If so, please identify them and describe them briefly for us.

Admiral DAVIES. Yes, we are. There are two projects, F17-537, test equipment analysis, and F12-525, human engineering, which are being initiated in fiscal year 1973. The Project F17-537 will provide research and development support to the DOD oil analysis program which conducts spectrographic analysis of oil as a routine means for early

detection of incipient engine failure. The planned funding will allow the evaluation of other methods of oil analysis for cheaper methods, less complex, and more readily available to operating units yet which would provide the same or better ability to predict imminent or long-range problems which require action in terms of preventive maintenance.

The second project, F12–525, was initiated to provide a coordinated thrust in human engineering by assembling a number of on-going tasks with individual objectives into a single unified objective to improve man-machine design to assure utilization of both in the roles that suit them best. Typical efforts include:

(*a*) low level stereoscopic simulation to determine the advantages of three dimensional displays on low-level flight and carrier landings; and

(*b*) validation of the effect of scene motion on observer performance in detecting and recognizing targets via television display.

Chairman ELLENDER. $7.6 million is requested for the project entitled ocean environmental support (general). Please describe this program briefly and give us its objectives.

Admiral DAVIES. I will be glad to do so. The project encompasses all of the basic oceanographic disciplines: Physics, chemistry, and biology in attempting to quantify those factors which affect anti-submarine warfare and thus provide bases for the design of new sensors. The orientation is strongly directed toward long-range acoustic propagation. The project objectives are to optimize the knowledge of the sea as it affects detection and attack of submarines.

Senator YOUNG. Are we cooperating with any other countries on this exploratory development project?

Admiral DAVIES. In the summer of 1973, a detailed submarine exploration [deleted] will be undertaken [deleted]. This survey will attempt to further describe ocean floor formation which will in turn aid in predicting ground propagation.

Chairman ELLENDER. Why do you need the increase of $612,000 you are requesting for fiscal year 1973?

Admiral DAVIES. This sum will be used to initiate a fairly large scale program to investigate [deleted].

[Deleted.]

Chairman ELLENDER. Of the total requested for "Support Technology," approximately $7 million is for a project entitled "Ocean Environmental Support (Shipboard)". Give a short unclassified description of this project and tell us its objectives.

Admiral DAVIES. I will be pleased to do so. As titled, the project occupies itself principally with increasing our understanding of oceanographic phenomena as they relate to shipboard (both surface and submarine) submarine detection systems. [Deleted.]

[Deleted.]

Senator YOUNG. What do you hope to accomplish in this project in fiscal year 1973?

Admiral DAVIES. [Deleted.]

Chairman ELLENDER. $7.9 million is for a project entitled "Medical Support." What other Government agencies are involved in research in this area, and how do you coordinate these efforts with those of the Navy?

Admiral DAVIES. Other Government agencies involved in "Medical Support" research and development activity include the Army; Air Force; National Aeronautics and Space Administration; Defense Nuclear Agency; Atomic Energy Commission; Department of Health, Education, and Welfare; Federal Aviation Administration; National Institutes of Health; U.S. Public Health Service; and National Oceanic and Atmospheric Administration. Coordination of "Medical Support" research and development efforts are affected through formal liaison provided by the biomedical research and development staffs within the military departments and the Director of Defense Research and Engineering Staff at the Department of Defense level. The Joint Medical Research Conference of the Department of Defense meets 11 times each year to review the research and development program of each department. Major coordination with Federal agencies other than Department of Defense is pursued in the areas of infectious and communicable diseases (National Institutes of Health); trauma resuscitation, and tissue preservation and transplantation (National Institutes of Health); Aerospace Life Support (National Aeronautics and Space Administration and Federal Aviation Administration); medical effects of nuclear radiation (Atomic Energy Commission); deep diving medical support (National Oceanic and Atmospheric Administration). The Navy cooperates with other Services and Agencies to computerize and exchange biomedical and allied science information through the Interagency Life Sciences Supporting Research and Technology Exchange.

Chairman ELLENDER. Please describe some of the major efforts to be undertaken in fiscal year 1973.

Admiral DAVIES. Some of our major efforts are:

(1) Study of environmental stress and fatigue and stress related health change as it effects personnel under all conditions of naval operations. Particular emphasis will be on combined stress effects in different occupations, individual psychological and physiological responses to these stresses in relation to health change and accidents during deployment, and cumulative fatigue effects. This effort has considerable relevance to the All Volunteer Force.

(2) Major effort continues in the development of acclimatization procedures for Marine troops to reduce heat casualties and maximize force strength at the objective area; the development of better methods in treating hemorrhagic and septic shock in battle casualties; and the development of protective measures against vibration/slam effects in high speed craft to minimize additional injury to patients during medical evacuation and to maximize the functional survivability of vital medical equipment in casualty receiving ships and ambulance craft.

(3) The Navy continues to place major emephasis in the prevention and control of infectious diseases of naval importance required to conserve manpower, relieve personnel replacement logistics, and reduce patient loads. The thrust of this effort has four major objectives:

(a) Define causes and characteristics of infectious diseases;

(b) Identify microorganisms causing acute respiratory disease and define the factors of transmission.

(c) Develop methods of control of insect vectors of disease; and

(d) Develop new methods for identifying microorganisms.

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(4) Much of our effort is directed toward the biological effects of electromagnetic radiation on the naval population. Emphasis is placed on effects of low level microwave and extra low frequency (ELF) exposure on the central nervous system. Included in this effort is the development of adequate domestic systems, methods of protection, and safety standards.

(5) Diving medicine continues to be of major importance in medical support. The nature of diving operations and the importance of diving safety form the basis for exploratory efforts in this area. Of precise interest are the effects of different diver breathing gases, auditory and vestibular damage in naval divers and altered diver metabolic rates. Associated with this effort is the study of depth-time limits of diving, biochemical indicators of diving stress, oxygen toxicity and decompression sickness. Particular current interest emphasizes the determination of the cause and prevention of two diver diseases, aseptic bone necrosis and high pressure nervous syndrome, which seriously effect the Navy's deep diving capabilities.

Senator YOUNG. I note several references in the descriptive summary to medical research in Ethiopia and Indonesia. Why is the Navy doing research in these countries and what kind of research is being carried out?

Admiral DAVIES. The Navy is performing medical research in Ethiopia and Indonesia because disease entities occur with sufficient frequency in those countries providing opportunity for research not available elsewhere. These diseases have both military and public health significance and the research serves the mutual interests of the countries concerned. Priority is given to those diseases of greatest military importance. Epidemiological surveys have found malaria, louse-born relapsing fever, African sleeping sickness, and Rift Valley fever in Ethiopia; and malaria, dengue fever, scrub typhus, and filariasis in Indonesia. Research is directed toward definition of causes, mode of transmission, and epidemic characteristics; and development of methods for diagnosis, treatment, and prevention of these diseases.

Chairman ELLENDER. Why do you need the increase of $823,000 you are requesting for fiscal year 1973?

Admiral DAVIES. This increase in funds represents a major augmentation of effort in diver safety to determine the cause and prevention of two diver diseases—aseptic bone necrosis and high pressure nervous syndrome as follows:

Aseptic bone necrosis causes pain and loss of function in weight-bearing joints. Repeated diving exposure and aging increases the risk of contracting this disease. Cause of the disease remains completely unknown and research effort will be directed toward determining the cause, treatment and/or prevention. Approach will consist of human prospective and retrospective studies, mechanisms of the disease, animal modeling to test various hypotheses and evaluation of possible prophylactic techniques.

High pressure nervous syndrome (or helium tremor) is characterized by tremulous uncoordination preceding convulsion which can lead to death. Tremor has been noted at depths as shallow as 600 feet. Although this pressure-induced central nervous system disturbance now poses a major biomedical limitation to safe deep diving, there is early evidence that it can be modified by drugs or diving technique. Animal

studies will be complemented by neuromuscular research on a cellular level to establish the mechanism of the syndrome and development of prophylactic techniques.

Senator YOUNG. $6 million is requested for the project entitled "Environmental protection." I note that a number of other Government agencies are engaged in activities related to this one. How do you coordinate these activities?

Admiral DAVIES. We coordinate with the other military departments through the Environmental Pollution Control Committee at the DOD level. At subordinate levels there exists other groups such as the joint civil engineering research and development group and the Joint Logistics Commanders Ad Hoc Panel for Ammunition Disposal which provide for formalized interservice coordination on specific aspects of pollution control research and development. Representation and participation by headquarters and field activity personnel in numerous meetings, conferences, and briefings provide forums for interchanges of information and result in the establishment of personal contacts essential to fostering interservice cooperation and coordination in this program.

We coordinate and cooperate with other Federal agencies and keep abreast of their programs and policies, including those of a regulatory nature which may affect us through representation on the Federal Council of Science and Technology Interagency Committees, the Armed Forces Pest Control Board, the National Interagency Committee on Oil and Hazardous Material as well as other Federal panels and councils addressing pollution abatement and control. Just as with our interservice relationships, there is also a great deal of informal direct contact and liaison at all levels with the Environmental Protection Agency (EPA), Maritime Administration (Marad), and U.S. Coast Guard, on matters of common interest or where particular problems arise which foster cooperation and coordination amongst the research and development communities of these agencies and ourselves. A great deal of interservice and interagency coordination and cooperation in the research and development area is also fostered as a result of the direct efforts and liaison of the Office of the Deputy Under Secretary of the Navy and the Office of the Environmental Protection Division in the Chief of Naval Operations' Office with the Council of Environmental Quality, Department of Defense, and other services. These offices while not primarily engaged in research and development are kept appraised of what we are doing and provide a continuum of formal and informal feedback based on their contacts and liaison which is used in shaping this research and development program.

Senator YOUNG. I also note that the Canadian Air Forces are engaged in similar research. What arrangements are made for exchange of information between the Navy and the Canadian Air Forces, and is there any joint funding agreement for research on protection of the environment?

Admiral DAVIES. The military departments including the Navy have recently had direct contact with the Canadians through the visit of the Canadian Defense Forces' director for pollution control management, Mr. Reginald Bowser and his assistant, Mr. Richard Gaylord. During this visit they were provided a short briefing on the Navy

environmental quality program including our research and development efforts. The Canadians are making a determined effort in the field of environmental protection, but their feeling while here being briefed was that they would prefer to have the U.S. Navy continue to take the lead in these efforts since we are fairly advanced in our attempts to solve many of the common environmental problems. This visit has laid the groundwork for a very firm liaison relationship by which we can exchange information. In response to your question regarding a joint funding agreement, there is none. The Canadians are not performing any research and development in the field of environmental protection that is related to our efforts, but rather are buying off-the-shelf, state-of-the-art equipment and watching our research and development efforts. They do have a particular interest in the results of our efforts in the application of the Coanda jet deflection phenomena to provide effective jet engine noise suppression equipment for use in jet engine testing.

Chairman ELLENDER. What are the major efforts on which you are planning to work during fiscal year 1973?

Admiral DAVIES. The major efforts on which we plan to work in environmental protection during fiscal year 1973 fall into six areas:

Ship pollution abatement.
Oil pollution abatement.
Ordnance pollution abatement.
Environmental protection data base.
Aircraft pollution abatement.
Pollution abatement ashore.

Our plans for fiscal year 1973 are a continuation or outgrowth of efforts initiated in fiscal year 1972 to identify Navy problems; collect data for their control; and to develop methods, techniques, and equipment not already available to correct pollution from Navy sources. Our approach gives priority to providing hardware, methods, and processes to correct known Navy pollution problems. It also provides for some longer range efforts looking at methods and alternatives to eliminate sources of Navy pollution through technology advances which will provide not only a nonpolluting method, but also a better way of doing it from the military, engineering, and/or economic viewpoint. Specifically for fiscal year 1973 we plan to:

Investigate shipboard feed and effluent waste stream handling and processing techniques which have application in both collecting, holding, and transfer to shore systems as well as shipboard treatment systems by virtue of their ability to reduce the final load for disposal by recycling of liquid or reduction in volume of solid matter.

Complete wet oxidation process studies and continue tradeoff and optimization studies on it and other processes for integrated waste management aboard ship.

Complete comparative study of alternative means for control of air pollution emissions from ship sources.

Continue testing of organometallic polymers for use in non-leaching-type antifoulant paints and incorporate them into paint formulations to replace existing, but polluting, leaching-type formulations.

Initiate development of non-air-pollution automated shipboard incinerator capable of burning garbage as well as wood and paper. Initiate testing of surface ship compactors for noncombustible refuse.

Continue to develop effective means of reducing the amount of subsistence packaging now requiring disposal aboard ship.

Continue evaluation and development of oil/water separation and oily waste treatment systems and techniques for shore and shipboard use.

Initiate investigation of flexible bladder membranes in shipboard ballasting systems to prevent mixing of fuel and water.

Investigate and implement methods of practically preventing oil and water "leaks" from shipboard machinery components to reduce large quantities of oily bilge wastes now generated on ships.

Continue development of Navy waste oil handling program to derive methods for efficient and economical means of using, reclaiming, or otherwise disposing of waste oil generated by the Navy afloat and ashore.

Continue evaluation of harbor oil spill containment and cleanup equipment and techniques with more emphasis on the conjunctive application of many methods previously singularly evaluated.

Continue with investigation and development of nonpolluting methods to reclaim or degrade propellants, explosives, and pyrotechnics including safety and scale-up tests of promising methods.

Increase efforts addressing the design and composition of ordnance hardware and materials such as to incorporate into them from the initial design stage a means of simplifying through reclamation or degradation.

Initiate ingestion studies in animals to determine biological effects and to establish toxicity levels for selected explosive components in water environment.

Continue developmental program for the Navy environmental protection data base and provide plans, procedures, and instructions for implementation Navy-wide by July 1, 1973.

Expand data base pilot tests and data collection into additional Navy complexes and complete design and implementation based on these efforts and developing user requirements.

Complete accelerated development and design of lightweight, semiportable noise suppressors based on use of Coanda jet phenomenon to abate jet engine testing noise from in-aircraft and out-of-aircraft tests.

Continue small-scale studies of aircraft engine combustor design and operating conditions and fuel properties to reduce exhaust emissions.

Complete design of nonpolluting carrier-based aircraft washdown system based on results achieved on shore-based water rinse system prototype.

Initiate study of Navy photographic processing techniques and facilities to identify chemicals used that may be pollutants and to devise methods to eliminate this pollution through use of different chemicals or treatment processes.

Continue investigations in feasible methods, such as afterburners, water spray devices, and propane ring burners, to eliminate air pollution resulting from bomb and warhead cookoff testing fires.

Complete performance testing of experimental vacuum waste water collection system for use at remote Navy bases.

Continue evaluation and development of improved methods of solid waste handling and disposal at Navy shore activities.

Chairman ELLENDER. $4.1 million is for personnel training devices technology. What are the objectives of this program?

Admiral DAVIES. The objectives of this program are as follows:

(*a*) To advance the technology in the fields of optics and associated disciplines with the goal of obtaining better visual simulation for Navy training devices;

(*b*) To obtain solutions to simulations problems by exploitation of advanced electronic techniques;

(*c*) To improve the simulation of the military environment (vehicles, sensors, weapons, et cetera) through the development of advanced computational techniques; and

(*d*) To apply the knowledge of human learning and behavior to the solution of problems inherent in training large numbers of differing people in military skills.

Senator YOUNG. What do you intend to do with the $4.1 million you are requesting for fiscal year 1973?

Admiral DAVIES. We plan to support a balanced program at the Naval Training Device Center, Orlando, Fla., in the development, fabrication, and establishment of feasibility of simulation components required for training devices. The following are examples of the efforts to be accomplished in fiscal year 1973.

(*a*) Evaluate a submersible sonar target vehicle which will give sonarmen at sea more realistic training; that is, present them training targets with reverberation effects and propagational path effects such as scattering, ducting, and attenuation. This target vehicle can be used at sea and will provide sonar returns equivalent to those of a real target.

(*b*) Fabricate a feasibility model of a firefighting simulator which will produce pollution-free gas products in the combustion process. In order to comply with the President's direction to all Government activities to reduce pollution, an attempt is being made to develop a fire whose gases are pollution free for use in firefighting training. This is as opposed to removing the polluting gases from the present fires.

(*c*) Evaluate the holographic carrier approach trainer. This project is investigating the feasibility of improving visual simulation in training devices by utilizing the unique, three-dimensional properties afforded by holograms.

Chairman ELLENDER. Of the total requested for support technology, $5.7 million is for the project entitled "Metallic Materials." Please describe the objectives of this project and tell us what you will do with the funds you are requesting.

. Admiral DAVIES. The metallic materials project supports the Navy's technology development program aimed at:

1. Enhancing our capability to effectively use existing metallic materials, and

2. Developing new metallic materials which would lead to increased naval system performance. Its objectives include steel, titanium, and aluminum alloy development, improved and new fabrication and welding techniques of these metals, corrosion control investigations, material evaluation and the development of comparative performance criteria, and testing methods and inspection techniques. With respect to the $5.7 million requested, the planned funding support is:

1. For ship and submarine metallic materials technology development, $4,5 million. This includes fabrication and welding technology, testing, and evaluation techniques for [deleted].

2. $1 million for aircraft metallic materials technology development, this includes high strength alloys for VTOL applications, high temperature alloys for gas turbines, and

3. $0.2 million for fatigue resistant gun barrel materials and lightweight armor composite material technology investigations.

Senator YOUNG. Has this project any relationship to the HY 130 steel projects that we have already discussed?

Admiral DAVIES. While the HY 130 steel alloy effort originated in this project is exploratory development several years ago, presently the exploratory development project does not directly support the HY 130 steel advanced development project. However, it must be recognized that many of the technology developments planned within the metallic materials project will contribute to the Navy's ability to effectively design and frabricate HY 130 steel and thus broaden its potential application base. For example, a vacuum degassing technique has recently been developed in the exploratory development project to reduce hydrogen, oxygen, and nitrogen interstitial elements in HY steel alloy castings in general. This will have a significant impact on making HY 130 steel a practical alloy, because the degassing process reduces unacceptable flaws from occurring during the manufacture of castings. In the higher HY steel alloy series, castings have been expensive because of the need to machine flaws out of the particular material parts.

Chairman ELLENDER. Why do you need the increase of almost $500,000 you are requesting for fiscal year 1973?

Admiral DAVIES. Basically, the increase of $500,000 will be used to augment efforts in three areas. In order to expedite development of new nondestructive testing techniques, suitable for laboratory, shipbuilding, and overhaul use, an additional $200,000 will be used to develop improved ultrasonic testing equipment. To support efforts in improving our ability to build submersible systems for deeper depth operations, $100,000 will accelerate the development of higher strength-to-weight piping alloys. Finally, $200,000 is required to develop a materials technology base for the new X7050 aluminum alloy in order to minimize the time before it can be utilized on aircraft structures.

Chairman ELLENDER. $4.5 million is for the project entitled "Reentry Vehicle Material Technology." What relationship has this project to the Poseidon-Polaris system?

Admiral DAVIES. The "Reentry Vehicle Materials Technology" project is supporting a program which is primarily aimed at developing materials technology for the high performance missile envisioned for deployment in the underwater long-range missile system (ULMS) submarines in the early 1980's. While much of the exploratory development project is long term in nature, it is also possible that carbon-carbon composite material developments will be completed in time to effect decisions on the near-term ULMS I missile, and thus on Poseidon submarines, as early as 1977–78. Carbon-carbon composite material would have nose-tip applications on missiles [deleted].

Senator YOUNG. I note that some of the research carried on under this project is performed jointly with the Air Force and the Atomic Energy Commission. Please comment on these joint efforts.

Admiral DAVIES. While we attempt in general to coordinate all our materials development efforts with the other services and Government

agencies, the size, importance, and complementary nature of the reentry vehicle materials project demands special management attention to insure maximum cooperation. Because of the Navy's progress and technical approach in the development of new concepts for weaving carbon-carbon composite materials, a joint Navy-Air Force assessment effort was established to determine the performance characteristics of the four concepts. The program is jointly funded with $200,000 from the Navy and $300,000 from the Air Force, with all the effort being carried out by industry. With regard to the participation of the Atomic Energy Commission, the Navy is taking advantage of expertise in the Los Alamos Scientific Laboratory and the Oak Ridge National Laboratory by supporting graphite material development investigations in these facilities. Essentially, both laboratories are engaged in developing new graphite material processing techniques to improve its mechanical performance under thermal stresses.

Chairman ELLENDER. Would you give a short, unclassified description of your planned program for fiscal year 1973 and tell us what you hope to accomplish with the funds you are requesting?

Admiral DAVIES. The reentry vehicle materials project's plans for fiscal year 1973 can be discussed in terms of four separate but related goals. First, the Navy is seeking to improve graphite materials for ballistic reentry vehicle nose-tips. Tests are planned to correlate variations in composition and fabrication parameters under thermal stress and ablative conditions to determine factors contributing to improved material performance. Second, we are continuing work on a new polyphenylquinoxaline resin material which has application for heat shields. We will concentrate on processing studies to determine feasibility of impregnating 3-D carbon-fiber composites, and we will test this new material for mechanical properties. Third, the Navy is attempting to exploit the inherent heat-resistant properties of beryllium, by exploring new processing techniques and material combinations. And, finally, we are developing new carbon-carbon material concepts [deleted]. In this area we are attempting to evaluate properties of orthogonal 3-D weaves and determine their relationship to variations in fabrication variables.

Senator YOUNG. Why do you need an increase of $1.4 million for this project?

Admiral DAVIES. The $1.4 million increase is required to augment the technology development efforts on graphite, the polyphenylquinoxaline materials, and the carbon-carbon composites. Funds are necessary to enable testing and evaluation of specific components under simulated environmental conditions. It is intended to push the development of these materials, because of their potential value to concepts for the near-term underwater long range missile system I missile.

Chairman ELLENDER. $7.4 million is requested for the project entitled "General purpose electronic materials and components." Describe this project and tell us what you plan to do with the funds you are requesting.

Admiral DAVIES. The electronic materials and components project supports the Navy's extensive requirements in the development of technology for electronic devices. Approximately $1 million will support device development directly relating to aircraft avionic systems. Efforts are concentrating on whole wafer large scale integration fabri-

cation technology, and optoelectronic technology for advanced communication and navigation systems. In technologies relating primarily to electronic countermeasure system applications, we intend to fund work amounting to $3.2 million. [Deleted.] With respect to device developments required for low light level systems, the planned level of support is approximately $1.7 million. [Deleted.]

[Deleted.] Approximately $0.9 million will support device technologies relating to radar system requirements. [Deleted.] And $0.6 million will support efforts on device technology for extreme environment applications, and work aimed at techniques for increased maintenance and reliability in general.

Chairman ELLENDER. Why do you need the increase of $931,000 you are requesting?

Admiral DAVIES. The $931,000 increase is for a new technology development program based on charge coupled device principles. This technology development was cited by the Honorable John S. Foster in his posture statement, because of its potential impact across-the-board on performance, cost and reliability in both optical imaging and computer memory systems. During fiscal year 1973, we hope to have established the basic feasibility of the technology by fabricating and testing various linear arrays.

LABORATORY INDEPENDENT EXPLORATORY DEVELOPMENT

Chairman ELLENDER. $14.6 million is for the program entitled "Laboratory independent exploratory development." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

LABORATORY INDEPENDENT EXPLORATORY DEVELOPMENT

Description.—This program provides the Technical Directors of the in-house laboratories with the means to exploit new ideas generated in-house and to investigate the feasibility of high-risk concepts. The scientists and engineers in the in-house laboratories are knowledgeable of Navy and Marine Corps problems and are a rich source of ideas for applying advances in the state of the art to the development of new concepts to meet current and projected threats. The independent program complements the directed exploratory development program which addresses specific recognized or established needs. Ideas supported under IED must be related to the mission of the laboratory. The total scope of IED thus covers surveillance, command and control, weaponry, vehicles, and support technology.

Work performed by.—Naval Air Development Center, Warminster, Pennsylvania; Naval Civil Engineering Laboratory, Port Hueneme, California; Naval Electronics Laboratory Center, San Diego, California; Naval Ordnance Laboratory, White Oak, Maryland; Naval Postgraduate School, Monterey, California; Naval Ship Research and Development Center, Bethesda, Maryland; Naval Ship Research and Development Laboratory, Panama City, Florida; Naval Undersea Research and Development Center, San Diego, California; Naval Underwater Systems Center, Newport, Rhode Island; Naval Weapons Center, China Lake California; and Naval Weapons Laboratory, Dahlgren, Virginia.

Program accomplishments and future program:

Fiscal year 1972 program.—Examples of work being pursued are:

(*a*) Determination of the feasibility of using fiber optic transmission lines to transmit data [deleted]. Such a system offers advantages of reduction in size and weight and in susceptibility to noise over coaxial transmission lines.

(*b*) Development of a homing system based on the most recent developments in broadband pulse communications and high-speed digital technology for application to future torpedo systems. Broadband pulse techniques offer substantial improvement in detection and classification capability.

(*c*) Determination of aspects of underwater electromagnetic phenomena applicable to problems of detection and surveillance in shallow water and riverine warfare.

(*d*) Studies of a variety of hull configurations and uses for limited-depth submersibles. These studies are concentrated on using reinforced concrete for the basic hull material and repetitive casting techniques to reduce construction costs.

(*e*) Development of a fluidic system for mixing two fluids continuously in desired ratios at varying demand rates. Such a mixing system design will result in insignificant corrosion in the seawater environment, better performance at high temperatures, and reduced cost and improved reliability in a variety of naval applications.

Fiscal year 1973 planned program. Planned increase is based on accomplishments since the inception of this program. Projects to be pursued in FY 1973 will be selected by the Technical Directors of the laboratories based on the progress of on-going projects during FY 1972 and on the potential pay-off of proposed new ideas.

Resources (In thousands of dollars) :

R.D.T. & E.N. funds for fiscal year 1971, 10,402; fiscal year 1972, 13,841; fiscal year 1973, 14,550; additional funds to completion and continuing; and the total estimate cost is not available.

LABORATORY INDEPENDENT EXPLORATORY DEVELOPMENT

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Admiral DAVIES. I will be glad to do so. Since one of the purposes of the program is to provide funds to the laboratory technical directors to start work on new ideas as they arise, the fiscal year 1972 program is still changing and the fiscal year 1973 program is just now being planned in the laboratories. Thus the fiscal year 1973 dollars shown in the list are the project engineers' projections of requirements rather than the laboratories' firm plans.

(The information follows:)

LIST OF LABORATORY INDEPENDENT EXPLORATORY DEVELOPMENT PROJECTS

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NADC	Multifunction Coherent Radar Techniques for Naval Airborne Applications	$ 225	$ 200	$ 150
	Solid-State Photometric Oximeter for Naval Aircrewmen	15	25	25
	Miniature, Portable, Solid-State Indicator of Myocardial Electrical Activity in Naval Aircrew Casualties	25	0	0
	Determination of Dynamic Center-of Gravity Shift of Humans when Ejecting from Naval Aircraft	15	0	0
	Integrated Fluidic Systems for Naval Fighter/Attack Aircraft	35	0	0
	Electrochemical Device for Determining Embrittling Hydrogen Content of Steel Parts in Naval Aircraft	20	20	35
	Conductive Transparent Films for Environmental Protection of Aircraft Missiles and Components	25	20	0
	Prevention of Sonobuoy Battery Deterioration	23	20	0
	Technique for Evaluating Surface Treatments for Preventing Fretting Corrosion in Naval Airframes and Power Plants	20	25	25
	Development of Metal Surface Treatment Processes for Compliance with Pollution Control Regulations	10	20	40

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NADC	Navy Fighter Close-In Combat Improvement	$ 120	$ 0	$ 0
	Feasibility of Developing of a "MIG 21" Simulator for Training Navy Combat Pilots	50	0	0
	Development of Counting Strain Gages for High G Naval Aircraft	30	6	0
	Development of Methods for Using the Fatigue Life Gage in Built-Up Aircraft Structures	30	0	0
	Variable Increment Digital Function Generator	0	40	55
	High Speed/High Altitude Ejection Seat Systems	0	35	120
	Air Combat Simulation Development	0	160	185
	Expendable Jammer Simulation	0	26	0
	Effect of Superposition of Gust and Maneuver Loads on Naval Aircraft Structural Materials	0	59	71
	Investigation of Microphone Operation in a High Noise Aircraft Environment	0	5	0
	Visual Approach and Landing Simulator for Non-Aviation Ships	0	73	400
	Unmanned Highly Maneuverable Vehicle	0	75	160
	Integrated Classification, Location and Analysis System (ICLAS); Development of	0	140	150
	Inflatable Towed Landing System	0	3	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NCEL	Subsurface Ice Thickening Techniques for Navy Polar Operational Bases	$ 4	$ 0	$ 0
	Applications of New Heat Transfer Concepts to Improve Performance of Navy Equipment	26	33	35
	Device for Mixing Two Fluids for Specialized Naval Applications	14	24	0
	Underwater Semi-Automatic Arc Welding for Naval Salvage and Seafloor Construction	33	3	0
	Development of High Heat Flux Heat Transfer Devices for Naval Shore-Based Applications	10	2	0
	Vibratory Locomotion for Specialized Navy Applications	30	49	26
	Diffusion of Chloride and Sodium Ions through Protective Coatings for Naval Shore Structures	9	6	6
	Bathymetric Mapping of Naval Seafloor Bases by Stereo Sonar	21	13	50
	Locating and Positioning Objects on Naval Seafloor Sites by Rotating Acoustic Scanner	20	0	0
	Buoyant Concrete Composite for Ocean Construction and Flotation	24	0	0
	Foams for Navy Pontoon Interiors	6	0	0
	Investigate Construction Techniques Utilizing Ammunition Boxes	19	0	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NCEL	Magnetically Pigmented Coatings for Underwater Painting of Naval Structures	$ 0	$ 12	$ 0
	System for Attachment of Explosive Packages to Structures in Adverse Environments	0	20	20
	High Performance Dual Mode Desalination Unit for Naval Bases	0	12	18
	Underwater Structures for Submarine Logistic Support	0	34	29
	Variable Plenum Chamber Pressure Air-Blaring Pad for Naval Applications	0	15	16
	Rebound Drilling, Preliminary Tests of Proof-of-Principle	0	6	0
	Evaluation of Recent San Fernando Earthquake and Possible Implications on Design of Naval Shore Facilities	0	2	0
	Structural Membranes for Undersea Use	0	15	15
	Dynamics of Cables During Deep Sea Deployment	0	11	0
	International Deep Ocean Corrosion Exposure Program	0	6	6
	Polytoroidal Tunneling Thruster for Specialized Navy Applications	0	12	22
	Smoke Removal for Use at Naval Facilities	0	30	16
	Chemical Systems for Wood Preservative	0	7	16
	Fluidic Concepts for Hydraulic Control Systems	0	9	24
	Polymer Strengthened Concrete	0	14	2
NCSL	Tests of Divers to Relate Hearing Proficiency, Orientation Capability, and Cumulative Diving Time	4	0	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NCSL	Development of Acoustic Lenses and Imaging Techniques for High Resolution Sonars	$ 120	$ 0	$ 0
	Analysis of Environmental Effects for High Resolution Sonar Development	20	0	0
	Neutralization of Nonburied Mines from Helicopters	60	0	0
	Advanced Magnetic Detector for Surveillance in Shallow Water Areas	93	21	170
	Use of Multiple Influence Sensors for Improving Detection Range of Magnetic Sensors Used in Shallow Water Surveillance	14	0	0
	Characteristics of Possible Long Range Mobile Mine Vehicles	0	20	0
	Three Component Electric Field Sensor	0	89	50
	Variable Magnetic Sensor for Surveillance	0	87	53
	Airborne Pulse Laser for Rapid Analysis of Coastal Environment	0	2	50
	Limits of Achievable Acoustic Spatial Resolution	0	20	27
	Control of Biological Environment of Man-Rated Hyperbaric Chamber	0	12	0
	Computer Design of Naval Diving Equipment	0	20	75
	Investigation of Ultrasonic Lenses and Imaging Techniques for Underwater Viewing Systems	0	0	75

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NCSL	Program Generation for Coastal Systems	$ 0	$ 68	$ 0
NELC	Application of Signal Processing Theory to Navy Communication	55	0	0
	Application of Design and Optimization Algorithms to Navy Design Problems	43	0	0
	Total System Design of a Digital Demodulator	40	0	0
	Optical Communication Techniques for Naval Applications	83	0	0
	Microwave Acoustic Signal Processing Devices	70	100	50
	Digital Fleet Broadcast	67	0	0
	Optical Components for Information Transfer	60	0	0
	Command Control Display Module Study	68	80	70
	Control Systems Modules	20	80	87
	Digital Module Coordination	35	0	0
	Evaluation of New Large-Scale Integrated Circuits	50	0	0
	Fiber Optical Telemetry (Joint NELC-NURDC project)	85	73	38
	Processing Techniques for High-Density, High-Speed Semiconductor Memories	0	40	0
	Optical Signal Cross Correlator for Active Sonar	0	78	44
	Shipboard Quality Monitor for HF Multichannel Circuits	0	40	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NELC	Fiber Optic Communications	$ 0	$ 175	$ 224
	Improved Display Techniques for Advanced Shipboard Display Systems	0	135	120
	Design of Navy Real-Time Data Processors	0	41	0
	Small Ship Electronics Systems	0	150	500
	A Better Power Supply Miniaturization Techniques Investigation	0	39	0
	Liquid Crystal Development	0	50	0
NOL	Acoustic Intercept Receiver	60	61	0
	Illumination by Active Pinging	5	0	0
	I-Spy; Development of Projectile System for Surveillance and Fire Control Designation	130	158	0
	Investigation of Techniques for Projecting Sonobuoys from Shipboard 5" Guns	101	112	0
	Automatic Missile Detector	181	44	0
	Cross-Type Parachute for Recovery System Application	31	42	45
	Advanced Digital Homing Panel for Torpedoes	193	296	0
	Magnetometer for Magnetic Naval Mines	33	31	0
	Water-Piston Propulsor System for Underwater Vehicles	7	0	0
	LADAR (Laser Detection and Ranging) Fuzing System	85	32	0

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LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NOL	Light Armor Development	$ 50	$ 48	$ 50
	Store Separation from Supersonic Aircraft	50	78	40
	Dust Cloud Development for Testing High-Speed Missiles in a Ballistics Range	41	43	45
	Theoretical and Experimental Study of Projectile Penetration into Naval Armor	46	0	0
	Fragment Initiation of Explosive Warheads	43	76	80
	New Design Concept to Achieve Cryogenic Environments for Infrared Detectors	12	59	59
	Improved Processing for Electrodes for Torpedo, Missile, and Submersible Vehicle Batteries	52	0	0
	Fabricate and Evaluate Composites Using New High Temperature Resin	34	0	0
	Optimization of Naval Weapons to Cause Ship Hull Damage	23	0	0
	A Shipboard Very-Close-In Self-Defense Weapon System	154	87	0
	Water Application of the Laser-Doppler Velocimeter	0	21	0
	Long Wavelength Infrared Missile Seeker	0	170	223
	Study Ships Pollution	0	5	0
	Guided Powered 6-degree of Freedom Trajectory Simulation Program	0	0	35
	Water Entry Telemetry Development	0	0	55

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NSRDC	Skirted Air Cushion Planing Hull for Naval Applications	$ 23	$ 10	$ 0
	High Length-to-Beam Ratio Air Cushion Ship for Naval Applications	50	155	500
	Stable Mobile Ocean Platform as a Naval Base	55	4	0
	Use of Large Ships as Naval Bases in Advanced Forward Areas	77	24	0
	Small Aviation Ship Study	209	0	0
	Analysis Techniques for Evaluating Performance Effectiveness of Naval Ship Concepts	38	40	40
	Digital Magnetic Tape Recorder for Collecting Test Data from Ships and Ship Models	24	5	0
	Improved Fidelity of Tape Recorders	12	0	0
	Optimization of Dimensions for Naval Small Craft	47	20	0
	Propulsion of High-Speed Displacement Ships	25	0	0
	Supercavitating Hydrofoil Development for High Speeds	27	0	0
	Small Special Mission Submarine Concepts	0	120	100
	Advanced Attack Submarine Concepts	0	60	0
	Applications of Superconducting Machinery to Naval Propulsion	0	45	0
	Optimization of Destroyer Design Characteristics Using Statistical Techniques	14	0	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NSRDC	Circulation Control High-Lift Wing	$ 109	$ 0	$ 0
	Light Fighter Technology	101	95	0
	Structural Design of Naval Boats Using Glass Reinforced Plastics	10	3	0
	Computer Simulation of Aircraft Carrier Weapons Handling Procedures and Flight Operations	83	0	0
	Wind Tunnel Measurements of Surface Ship Propeller Forces	11	0	0
	Reduction of Unsteady Propeller Thrust for Ships and Submarines	15	12	22
	Measurements of Low-Level Radiated Noise from Submarines	9	0	0
	Acoustic Coatings for Reducing Submarine Detectability	29	0	0
	Techniques for Calculating Ship Vibration Characteristics in Preliminary Designs	28	20	20
	Solid State Inverter for Navy Ship Power Applications	19	0	0
	Development of Superconducting Machinery	115	106	0
	Fluidic Controls for Shipboard Cooling Systems	10	0	0
	Pump and Pipe System Characteristics with Dilute Polymer Solutions in Naval Service	37	40	0
	Heat Transfer in Dilute Polymer Solutions for Naval Service	20	0	0
	Ferrocement Boats	40	26	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NSRDC	Technical Feasibility of Very High-Speed Naval Craft	$ 33	$ 0	$ 0
	Seakeeping Performance of Semisubmerged Platforms	37	0	0
	High Speed Naval Catamaran Design and Performance	0	160	0
	Propulsion, Supership and Floating Base	17	0	0
	Shaped Field Superconducting Laboratory Machine Construction	33	145	0
	Development of Corrosion-Free Alloys with High Strength or High Wear Resistance	41	40	0
	Accelerated Biodegradation of Sanitary Waste Solids	45	0	0
	Field X-Ray Diffractometer for Residual Stress Studies in Naval Structures	45	45	0
	Titanium Alloy Castings for Navy Applications	59	33	0
	Mitigation of Slime Formation Affecting Submarine Periscopes and Antifoul Coatings	50	50	0
	Integrated ASW Platforms	0	20	0
	Fast Light Air Capable Sub Hunter	0	65	0
	Aviation Ship Systems	0	125	0
	DOLPHIN Performance Characteristics	0	25	0
	Propeller Strength	0	45	0
	Modified Catamaran Structural Design and Weight Study	0	100	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NSRDC	Viscoelastic Material Properties for Ship Silencing Applications	$ 0	$ 20	$ 0
	Operating Effectiveness of Submarine Silencing Concepts	0	25	15
	Small Special Mission Submarines	0	120	100
	Low Water Plane Catamaran Studies	0	160	500
	Nonmagnetic Submarine	0	130	100
	Automation of Naval Vehicles	0	112	100
	Sintered Metal for Ship Silencing	0	5	30
	Submarine Speed and Resistance	0	50	150
	Slurry System Development	0	0	200
	VSTOL	0	0	100
	Shallow Water Submarines	0	0	100
	Development of Corrosion Free Alloys	0	0	55
	Feasibility of Diffusion Bonding of Titanium	0	0	55
NURDC	Target Strength of Concrete Submarine Hulls	24	0	0
	DEEP VIEW Submersible	205	167	0
	Diver Armor	33	0	0
	Shark Dart	21	0	0
	Glass Study (Technology)	77	0	0
	New Vehicle and Sonar Concept Studies	90	95	25

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NURDC	Hull Vibration Generation and Detection for Acoustic Energy Transmission	$ 0	$ 11	$ 34
	Acoustic Echo and Hull Vibration Analysis of Kamloops Data	0	20	30
	Semisubmersible Sonar and Survey Platform	0	50	90
	Application of Infra-Red Photogrammetry in Polar Regions	0	12	10
	Spar Buoy Helicopter	0	60	95
	Active Sonar Hull Concealment Analyses	0	20	57
	Development of VLF Acoustic Source	0	74	82
	Hull Excitation	0	10	0
	An Optical Signal Cross-Correlator for Active Sonar	0	22	46
	Project GNATS	0	10	0
	Underwater Signals	0	20	130
	Noise-Field and Array Performance Comparison for the AN/BQR-7 on SSBN 619 and SSN 637	0	25	0
	Undersea Systems Countermeasure	0	40	60
	Towed Fuel Pods for Semisubmerged Ships	0	30	0
	Glass-Ceramic Windows and Hulls for Submersibles	0	55	50
	Acrylic Pressure Hull Technology	0	50	50
	Helo-Launch and Recovery Submersibles	0	30	0
	Laser Technology Applications	0	20	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NURDC	Reinforced Concrete Submersibles	$ 78	$ 0	$ 0
	Adaptation of Head-Coupled TV to CURV	22	0	0
	Sulphur Concrete for Submersible Hull Repair	10	0	0
	Flow and Optical Effects Produced by Mineral Platelets	17	0	0
	Artificial Pinna (Outer Ear) for Applications in Undersea Research and Exploration	71	0	0
	Acoustic Materials for Sonar and Acoustic Torpedoes	109	0	0
	Spherical Shell Acrylic Windows	30	0	0
	Saline Operated Hydrometers	38	0	0
	Hydro-Transducer	35	0	0
	Transparent Hull Submersible to Develop Deep Submersible Buoyant Pressure Hulls	66	75	0
	Tools for Special Warfare (Underwater Operations)	30	39	55
	D'Artagnan	106	0	0
	Supercritical Combustion Gas Thermal Power Plant for Undersea Application	53	0	0
	Glass Elevator for NURDC Oceanographic Tower	18	25	23
	Optical Data Study	69	113	90
	Capsule Demonstration	35	0	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NURDC	Procedures for Evaluating Hardware and Tactics at Sea	$ 0	$ 10	$ 20
	Underwater Thermal Power System Development	0	20	100
	Acoustic Emission for Detection and Analysis of Failures in Glass	0	20	34
	Acoustic Propagation and Signal Processing Analysis	0	30	0
	High Value Target Classification	0	40	20
	Hydrographic Winch Arrester	0	5	0
	Automation-Clinical Laboratory Information	0	8	36
	Cryogenic Propellants and Exhaust Disposal for Undersea Power Systems	0	60	0
	New Electronic Concepts	0	45	0
	New Concepts Development	0	60	150
	High Speed Towed Sonar Investigation	0	65	50
	Diver's Navigation System	0	6	15
	Low Light Level Viewing System for Divers	0	38	41
	Submersible Cable Actuated Teleoperator (SCAT)	0	35	114
	Optical Visibility Instruments for Submersibles	0	15	80
	Mobile Ocean Research Station	0	40	0
	Concrete Capabilities	0	10	30
	Buoyancy Actuated Launch and Retrieval Elevator Support System	0	65	164
	Remote Observation and Work Vehicle (SNOOPY)	0	15	30

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NURDC	Preparation of HYDRA II Report	$ 0	$ 4	$ 0
	General IR/IED Support (Code 01 Reserve)	0	0	0
	Biological Ropes for Underwater Use	0	0	20
	Acoustic Scattering Models	0	33	37
	Acoustic Ray Theory and Target Localization	0	0	26
	Analysis of a Triangular-Element Cylinder as a Pressure-Resistant Structure	0	12	0
	Hull and Structural Quietening Through Use of Composite Materials	0	0	15
	Plasma Spray Coatings for Corrosion Protection	0	12	0
NUSC	Underwater Propagation of Laser Radiation for Military Application	32	25	25
	Some Hydrodynamic Noise Characteristics of Long, Slender Towed Sonar Arrays	60	0	0
	Study of Hydrodynamic Shock Damage Potential on Sonar Transducers	32	0	0
	Applications of Liquid Crystal Technology to Surface Temperature Measurements of Sonar Transducers	40	40	50
	Sonar System Model Development	120	55	55
	Sensory Models of Sonar Operator-Display Combination	32	20	32

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NUSC	Sonar Display Model	$ 12	$ 30	$ 0
	Finite Element Holography Development	32	0	0
	Applications of Statistical Communication Theory to Target Detection and Classification	5	50	50
	Fourier Transform Signal Processing for Sonar Systems	60	100	110
	Effects of Water Pollution on Naval Operations	40	54	150
	Studies of the Channel Capacity of an Underwater Acoustic Telemetry System	12	0	0
	Investigation of Laser-TV Observation System	62	20	25
	Riverine Underwater Detection Application of Electromagnetic	40	40	30
	Application of Interferometric Holography to Sonar Transducer Measurements	24	40	50
	Holography for Sonar Instrumentation and Signal Processing	80	50	60
	Project FIRST (Fixed Round Simple Torpedo)	145	0	0
	Advanced Mobile Submarine Simulator	115	60	164
	Broadband Acoustic Detector	104	0	0
	Target Classification Study	100	115	25
	Digital Torpedo Technology	70	200	100
	Computer Guidance	33	0	0
	Stress of Armored Cables	0	10	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NUSC	Shock on Submerged Structures	$ 0	$ 15	$ 0
	Acoustic Propagation Model	0	40	47
	Norwegian Sea Data Exchange	0	4	0
	Submarine Flow Field Model	0	10	0
	Array Signal Processing	0	15	20
	Electro-Optic Device Applications	0	20	0
	Advanced Multi-Mission Torpedo	0	512	500
	Research Vehicles Development	0	20	0
	Advanced Torpedo Propulsion	0	75	0
	Modeling of Hierarchal Computer Systems	0	15	0
	Sequential Machines with Fault Detection Capabilities	0	15	0
	Intonation Aspects of Speech	0	15	27
	Underwater Acoustic Propagation Studies	0	50	0
	Quantitative Brine Removal System for Sampling Ocean Cores	0	5	0
NWC	Radio Frequency Holography	130	70	0
	Portable Attack Warning Radar	128	99	0
	Liquid Crystal Image Converter and/or Display	45	45	160
	Infra-Red to Visible Image Converter	30	0	0
	Extended Long Wavelength Cutoff for Surface Barrier Detectors	20	0	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NWC	Target Obscuration	$ 122	$ 280	$ 258
	Microwave Radiometry Digital Adaptive Area Correlator	100	50	0
	Air Launched Cruise Attack Missile	406	0	0
	Digital Timer Fuze	121	0	0
	Common Aperture Dual Mode (IR/RF) Seeker	50	30	241
	Explosive Enhancement Process Concept	49	0	0
	Attack Aircraft Systems Investigations	150	100	100
	Refrigerated Infra-Red Detector/ Preamplifier	51	0	0
	Energy Conversion: Propellant Applications of Modified Ammonium Perchlorate	104	54	0
	Head-Coupled TV - Gun	5	0	0
	Closed Loop Fire Control and Fuze Shell	115	85	0
	HARM Propellant	40	0	0
	Short-Pulse Magnetron	50	100	100
	Poly Powder Flare	25	0	0
	ARGUS Missile	27	0	0
	Infra-Red Spectral Discrimination by a Two-Color Sandwich Detector	57	25	24
	Automatic Target Screening	30	47	160
	Holographic Lens	0	15	100

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NWC	Aircrew Escape System Stabilization and Control	$ 0	$ 85	$ 72
	Rapidly Tunable Laser	0	40	0
	Fluidic Thruster	0	40	0
	Mobile Spar Buoy	0	30	300
	Optical Warning	0	30	46
	Conformal Array Radar	0	45	90
	Laser Detector	0	48	90
	Aerosol Optical Properties	0	30	189
	Towed Target	0	30	0
	Image Cross Correlation	0	20	130
	Doppler Radar	0	50	100
	Microwave Radiometry, Time of Arrival	0	70	0
	Passive Infra-Red Seeker	0	22	0
	Augmented Inertial Navigation	0	44	0
	Anti-Surface Ship Infra-Red	0	50	39
	Forward-Looking Infra-Red Application	0	56	170
	Tactical Data System for A7E Aircraft	0	20	0
	Point Defense Application of SIDEWINDER	0	70	0
	Laser Guided WALLEYE	0	80	0
	Feasibility Demonstration of Advanced Point Defense System	0	200	270
	Long Range CHAPARRAL Missile for Point Defense	0	72	0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
NWC	Gas Dynamic Laser	$ 0	$ 75	$ 0
	Advanced Weapon Suspension and Release Equipment	0	15	0
	Long-Range CONDOR Missile	0	100	0
	Penetrator Warhead	0	50	120
	Ramjet Missile Propulsion	0	25	171
	Secure Range Communications	0	70	0
	Active Optical Fuze	0	25	0
	Active Optical Terminal Homing	0	30	0
	Parametric Amplification of Infra-Red Detectors	0	25	25
	Digitized Transducer	0	25	47
	Microwave Isolators	0	30	30
	Modulatable Detection	0	50	50
	Josephson Junction	0	30	25
NWL	Liquid Layer Gun Barrel Concept	50	54	0
	Increased in Projectile Range through Aerodynamic Drag Reduction by External Burning	52	0	0
	Improved Ammunition Replenishment for Major Caliber Light Weight Gun System	31	0	0
	Optimization of Projectile Impact Point Determination	10	0	0
	Liquid Propellant Guns	58	0	0
	INFIGHTER: Dual Purpose Point Defense Gun System	78	0	0
	Self-Contained Aerial Multi-Purpose System	45	0	0
NWL	Projectile Altitude Measurement System	45	$ 36	$ 0

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
	Time Resolved Gun and Explosion Flash Spectra Measurement	$ 20	0	0
	Gun Fire Control: Optical Mount Communication	43	0	0
	Gun Fire Control: Programmable Cathode Ray Tube Console	15	0	0
	Improved Surface Launchers/ Ammunition Handling	31	0	0
	Development of Computer Techniques Applicable to Naval Ordnance Problems	70	0	0
	Naval Weapons Effects in Nuclear Air Blast Simulator	17	0	0
	Interaction of Human Body with Electromagnetic Environments	5	0	0
	Gun Wear Studies	7	0	0
	Application of High-Low Ballistic System to Guns and Mortars	0	54	100
	Composite Plastics/Polymers for Ordnance Application	0	19	0
	High Performance Shaped Charge Armor Material	0	18	0
	Technique for Diagnosing In-Bore Explosions	0	15	0
	Microwave Interrogation System	0	50	0
	20-mm All-Zirconium Projectile	0	10	0
	Unintentional Radiation Detection	0	72	0
	Mischmetal Shock Properties Investigation	0	15	60
NWL	Gunfire Accuracy Improvement through Electromagnetic Spotting	$ 0	$ 30	$ 0
	Flight Dynamics of Spin-Stabilized Projectiles	0	45	80

LABORATORY	PROJECT TITLE	DOLLARS IN THOUSANDS FY 71	FY 72	FY 73
	Gun Launched Antisubmarine Weapons	$ 0	60	250
	Real Time Projectile Guidance and Control Simulation	0	35	0
	Surface Effect Ship Characterization	0	15	30
	Tactical Mission Cost Methodology	0	30	0
	Validation of Computer Programs	0	45	30
	Applications of a Test Generation and Simulation System to Digital System Design	0	40	40
	Interactive Computer Graphics	0	30	33
	Pattern Recognition Using a Pattern Processing System	0	26	26
	Laser Flash Camera Study	0	28	35
	In-Flight Rocket Motor Duration Detector	0	10	0
	Linear Induction Motor Gun	0	30	0
	Gas Depth Charge Detonation System	0	10	0
	Application of Acoustic Emission to Titanium Alloy Development	0	7	0
	Lightweight Modular Gun Fire Control System	0	25	50
	Impact Properties of Low Melting Point Alloys	0	10	0
NWL	Hollow Cylindrical Penetrators	$ 0	$ 10	$ 0
	Anti-Ship Missile Defense Planning and Analyses	0	19	26
	Beacon Guidance Anti-Surface Warfare	0	5	0
	Sound Focusing Effects	0	14	0
	Frangible Projectile	0	10	0

LABORATORY INDEPENDENT EXPLORATORY DEVELOPMENT

Chairman ELLENDER. Why do you need the increase of $709,000 you are requesting?

Admiral DAVIES. This is a level-of-effort program. The increase of $709,000 is a 5-percent cost-of-living increase.

Chairman ELLENDER. Of the total requested, $4.1 million is for the project entitled "Special laboratory support—weaponry." Is all of the work on this project performed in Navy inhouse facilities?

Admiral DAVIES. All the money in this element goes to inhouse laboratories. The only funds they spend on contract are for materials and services in support of the inhouse effort.

Senator YOUNG. Describe your planned program for fiscal year 1973 and comment on your need for the $85,000 increase you are requesting.

Admiral DAVIES. The actual fiscal year 1973 program is now being planned in the laboratories. However, we can anticipate that work will continue on improved seekers, fuzes, propulsion, and warheads for missiles and on the exploration of new concepts for weapons to defend the fleet against cruise missiles. The $85,000 increase requested is only a 2-percent increase which means that the level of effort on this project will actually decrease slightly if our projection of a 5-percent cost-of-living increase is accurate.

Chairman ELLENDER. $3.7 million is for the project entitled "Special laboratory support—naval vehicles." What were your accomplishments in this project in fiscal year 1972, and what do you hope to accomplish with the funds you are requesting for fiscal year 1973?

Admiral DAVIES. Two research submersibles, one with a transparent acrylic plastic spherical hull and the other with a glass hemispherical bow, have been certified for operation. These developments have not only advanced knowledge on the use of such materials in pressure hulls but will also provide operational vehicles for oceanographic research. Considerable effort has been expended on optimizing design concepts for low water-plane catamarans. Advances have been made in demonstrating the feasibility of superconducting electrical machinery which offer the possibility of significant size and weight reductions in machines of a few thousand horsepower or greater. The catamaran studies will continue into fiscal year 1973. The feasibility of a high length-to-beam ratio air cushion ship is being investigated because the concept offers a high-speed platform for naval aircraft operations. New concepts will be applied in the development of an aircraft ejection seat system to extend the altitude for safe ejections both above and below current capabilities. These projects are a few examples of the fiscal year 1972 accomplishments and fiscal year 1973 plans.

NUCLEAR PROPULSION TECHNOLOGY

Chairman ELLENDER. Of the total requested for other equipment, $21 million is for three projects funded under the program entitled "Nuclear propulsion technology." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

CATEGORY: Exploratory Development

TITLE: Nuclear Propulsion Technology
BUDGET ACTIVITY : 7 - Other Equipment

DESCRIPTION: This program consists of three exploratory development projects which provide a continuing program of research, development, test and evaluation directed toward the application of nuclear propulsion to Naval vessels ranging from small submarines to large combatant surface ships. The nuclear propulsion exploratory development program includes work in pressurized water technology, decontamination processes, power plant materials development and evaluation, refueling technology, radiation control, shielding design and development, chemistry control and submarine and surface ship nuclear plant design and development. Exploratory development provides the technical basis needed to support the development of advanced submarine and surface ship propulsion plants.

WORK PERFORMED BY: Westinghouse Electric Corporation, Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, Pennsylvania; General Electric Company, Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, New York.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM:

FY 1972 Program: The broad technological program of design, development, and testing of new and improved reactor plant components and systems will continue. New nuclear propulsion plant designs and concepts will be evaluated to determine areas of further development. Reprogramming of existing computer codes and the development of advanced codes will make possible the application to this program effort of two large high-speed computers being procured by the Atomic Energy Commission for its Bettis and Knolls Atomic Power Laboratories. These laboratories are used by the Navy for its nuclear propulsion development work. The materials development effort will include testing materials in various high temperature high pressure environments present in an operating reactor plant, and evaluation of wear characteristics, corrosion and mechanical properties. Welding effort will concentrate on making high integrity seal welds to join the control rod drive mechanisms to the reactor vessel head. Further evaluation of reactor fluid systems will permit the continuing exploration of those aspects of primary and secondary fluid systems that affect reactor control and operational reliability. Plant arrangement studies will consider accessibility, handling and replacement of components, piping and structures.

FY 1973 Planned Program: Development of nuclear propulsion plant components and systems with greater reliability and maintainability will continue as will the study and analysis of advanced propulsion plant concepts. Detailed analysis of operating data from the increasing number of nuclear powered ships and from the AEC-owned prototype plants, and evaluation of advanced concepts will continue in support of the effort to advance nuclear propulsion plant technology. Material development efforts will continue to evaluate plant material performance under various stress and wear conditions present in a reactor environment. Plant chemistry development will evaluate the use of alternate coolant additives in nuclear plants, and analyze improved filtration systems and filtering techniques. Shielding arrangement studies will be conducted using computer simulation of neutron environments to determine neutron dispersion parameters. Refueling equipment and procedure development effort will support fueling and refueling operations, process and evaluate trouble reports, and support field modifications. As nuclear propulsion technology becomes more advanced, increasing emphasis will be placed on plant simplicity and operability.

RESOURCES: (In thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	19,800	20,140	21,000	Continuing	NA

NUCLEAR PROPULSION TECHNOLOGY

Chairman ELLENDER. Please provide a tabulation for the record listing the three projects, the amount for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Admiral DAVIES. I will be glad to do so.

(The information follows:)

[In thousands of dollars]

	Fiscal year—		
	1971	1972	1973
Submarine nuclear propulsion	5,850	5,870	6,000
Surface ship nuclear propulsion	5,950	6,170	6,300
Multipurpose nuclear propulsion technology	8,000	8,100	8,700
Total	19,800	20,140	21,000

Senator YOUNG. Why do you need the increase of almost $1 million you are requesting for fiscal year 1973?

Admiral DAVIES. Exploratory development provides the technical basis needed to support the development of advanced submarines and surface ship propulsion plants. Due to the sharp escalation of costs for research and development, the $21 million requested in fiscal year 1973 represents the minimum funding necessary to maintain a level effort program. In comparison, the Soviet Union continues to build an already impressive program of research and development work in nuclear propulsion technology.

Chairman ELLENDER. $6 million is for the project entitled "Submarine Nuclear Propulsion." Please describe this project, and tell us what you hope to accomplish with the funds you are requesting for fiscal year 1973.

Admiral DAVIES. This project includes the design, development, test, and evaluation of submarine nuclear propulsion plant systems and components and supports the development of significant improvements in submarine plant performance. Fiscal year 1973 effort will include work in areas such as materials application, fluid systems, plant arrangement, shielding design, radiation control, and plant chemistry. [Deleted.]

Senator YOUNG. Did you complete all of your objectives for fiscal year 1972?

Admiral DAVIES. This effort which is aimed toward advancing submarine nuclear propulsion technology incorporates objectives which are multiyear in scope and context. Fiscal year 1972 objectives and effort included increased emphasis on plant simplicity and operability as well as greater reliability, longer life, and improved maintainability of components and systems.

Chairman ELLENDER. Of the total requested for nuclear propulsion technology $6.3 million is for a project entitled "Surface ship nuclear propulsion." I note in the descriptive summary that considerable progress has been made in lengthening reactor core life and in increasing the output of nuclear propulsion plants. Was most of the research which resulted in these improvements done by the Navy or by the Atomic Energy Commission?

Admiral DAVIES. The Atomic Energy Commission is responsible for funding the design, development, fabrication, and prototype testing of new reactor cores which are developmental in nature. In this context the Atomic Energy Commission research and development effort was responsible for lengthening reactor core life. The Navy is responsible for the development of nuclear propulsion plant items, provision of special naval features in reactor equipment, and construction of ships and their complete nuclear powerplants. Technological advances in areas such as materials application, shielding development, and plant chemistry, all funded by the Navy, have led to improved plant performance and longer plant lifetimes.

Chairman ELLENDER. Does this longer core life and increased output result in dollar savings of any size in the case of the large carrier such as the *Enterprise*?

Admiral DAVIES. The extension of core lifetimes does reduce costs and yard time of ship by eliminating refueling requirements. For example, the first and second cores used in *Enterprise* lasted 3 and 4 years respectively. The new cores are expected to last 13 years. Other savings will accrue through Navy efforts to increase plant reliability, simplicity, maintainability, and operability.

Senator YOUNG. Does extensive modification work have to be done to accommodate these new cores?

Admiral DAVIES. No; Navy work in this program is closely coordinated with the Atomic Energy Commission (AEC), Division of Naval Reactors, research and development work on nuclear reactor plants and cores. This close coordination continues to assure the compatibility of Navy funded propulsion plants and reactor plants and cores developed by the AEC with minimum modifications.

Chairman ELLENDER. What do you hope to accomplish in your planned program for fiscal year 1973 and why do you need the increase of $130,000 you are requesting?

Admiral DAVIES. Surface ship nuclear propulsion research and development work provides the basic technology needed to develop and improve nuclear propulsion systems for surface ships. Fiscal year 1973 effort will include analysis of operational data and the development of design improvements based on this analysis, an extensive materials development program, plant chemistry work, shielding development, and radiation control effort. Work in this area provides the technical basis for simplifying and improving the operation and maintenance of ships already authorized and for the development and improvement of advanced surface ship nuclear propulsion plants.

Chairman ELLENDER. $8.7 million is for the project entitled "Multipurpose nuclear propulsion technology." Please describe this project and tell us what its objectives are.

Admiral DAVIES. This project provides for the support of nuclear propulsion work not uniquely directed toward either submarine or surface ship propulsion plants. Work in this area involves such areas as pressurized water technology, plant chemistry, shielding development, radiation control, materials application, and component analysis. These efforts are applied toward the goal of increasing plant reliability, maintainability, operability, and simplicity.

Senator YOUNG. What will you do with the funds you are requesting in fiscal year 1973?

Admiral DAVIES. Fiscal year 1973 effort will include such areas as materials, chemistry, shielding design, radiation control, and component improvement. Specific effort will include the analysis of various material characteristics in a reactor environment, the use of new computer codes and new analytical techniques, and work on increasing reactor coolant purification capabilities.

Chairman ELLENDER. Why do you need the increase of $600,000 you are requesting?

Admiral DAVIES. Multipurpose nuclear propulsion technology is an integral part of the overall exploratory development effort for improving nuclear propulsion plants. It is this overall program that has provided the basic technology required to support our operating nuclear fleet and provide for future advances in submarine and surface ship nuclear propulsion plant design and development. Research and development effort in this program has led to the initiation of advanced development projects such as the aircraft carrier type dual reactor, nuclear propulsion plant project and the high speed nuclear attack submarine propulsion plant project.

ELECTROMAGNETIC AND OPTICAL SYSTEMS

Chairman ELLENDER. Of the total requested for other equipment, $15.9 million is for the program entitled "Advanced electromagnetic and optical systems." Can you give us a short description of this program?

Dr. FROSCH. This program element covers five projects all of which contain classified information. A meaningful explanation of the program which includes classified information follows.

FISCAL YEAR 1973 R. D. T. & EN. DESCRIPTIVE SUMMARY

ELECTRO-MAGNETIC AND OPTICAL SYSTEMS (ADVANCED)

Description.—This program element contains the following five projects:

W11 night/day ASM Sys. Tech.—This project is directed toward the development of critical seeker and related weapon subsystem technologies for application to air-to-surface weapon systems supporting the advanced day/night aided visual attack mission. The project has been confined to three related areas of effort: (a) Advanced Seeker Development, (b) Advanced Night Attack Weapon System Development and (3) System Coordination, Integration and Evaluation.

U17–54 high energy laser.—Since 1968 High Energy Laster (HEL) potential for "order of magnitude" improvement in weapon systems has spurred Navy (and Department of Defense) development of HEL technology. Because of the laser weapon characteristics of increasing lethality with decreasing range, rapid target switching, and other advantages, [deleted].

S33–18 IR C/M.—This project will provide a self protection capability for ships [deleted].

W33–59 Electro-Optical C/M.—The objectives of this project are to: (a) develop electro-optical countermeasures (EOCM) techniques and systems [deleted] and (b) develop EO sensor systems [deleted] and (c) evaluate EO collection senors and EOCM systems.

S36–60 shipboard EO surveillance.—This project will give surface platforms an EO intelligence gathering capability and a low light level navigation, reconnaissance and station keeping capability.

Work performed by.—Most of the work under this element is being accomplished by in-house laboratories and a few contractors. The most important ones are: Naval Research Laboratory; Naval Ordnance Laboratory; Johns Hopkins University; Naval Weapons Center, China Lake; Naval Missile Center, Point Magu; Aerojet General Corp., Azusa, California; and Texas Instruments Inc., Dallas, Texas.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—W11–55 night/day ASM SYS TECH.—[deleted].
U17–54 high energy laser.—[deleted].
S33–18 IR C/M.—[deleted].
W33–59 Electro-Optical C/M.—[deleted].
S36–60 shipboard EO surveillance.—[deleted].
Fiscal year 1973 planned program.—W11–55 night/day ASM SYS TECH.—[deleted].
U17–54 high energy laser.—[deleted].
S33–18 IR C/M.—Not funded in fiscal year 1973. [Deleted.]
W33–59 Electro-Optical C/M.—[deleted.]
S36–60 shipboard EO surveillance.—[deleted].
Program to completion—W11–55 night/day ASM system TECH.—[deleted].
U17–54 high energy laser.—[deleted].
S33–18 IR C/M.—[deleted].
W33–59 Electro-Optical C/M.—[deleted].
S36–60 shipboard EO surveillance.—[deleted].
Resources. (In thousands of dollars):
R.D.T. & E.N. funds for fiscal year 1971, $8,462; fiscal year 1972, $16,446; fiscal year 1973, $15,915; additional funds to completion are continuing; and the total estimated cost is not available.

ELECTROMAGNETIC AND OPTICAL SYSTEMS

Chairman ELLENDER. I note that by far the largest part of this request is for the project entitled "High Energy Laser Program." Has the committee been provided with complete details on this project?

Dr. FROSCH. Yes, sir.

Senator YOUNG. Is any of the work on this project being performed by one of the Federal Contract Research Centers?

Dr. FROSCH. Yes, sir; the Applied Physics Laboratory at Johns Hopkins University is associated with the high energy laser program.

TACTICAL COMMAND AND CONTROL

Chairman ELLENDER. $2.6 million is requested for the program entitled "Tactical Command and Control (Advanced)." I note that the entire sum requested is for a project on the command data system. Selected pargraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

TACTICAL COMMAND AND CONTROL (ADVANCED)

Description.—The objective of this project is to develop necessary hardware such as display, peripheral, and software system designs for effective integration of Naval Command Data Systems and to facilitate necessary interfacing with Command Data Systems of the other services. Compatibility with existing NTDS equipment and software will be maintained while providing the improved and increased capabilities made possible by advanced features of the AN/UYK–7 computer system. Integration of additional tactical functions will be accomplished, and extensions of the UYK–7 computer system to other integrated command and management data systems will be developed. Development and evaluation will be conducted of software management methods and standardization procedures to ensure system compatibility and reduce software costs.

Examples of the equipment hardware and software under development are [deleted].

Work performed by.—Univac, St. Paul; Hughes Aircraft, Fullerton, California; Collins Radio Company, Dallas, Texas; Naval Electronics Laboratory Center, San Diego, California.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

[Deleted.]

Fiscal year 1972 program.—Exploitation of more powerful Command and Control applications using the UYK–7 comupter, new associated components such as micromin magnetic tape unit and displays, and expanded software techniques.

Fiscal year 1973 planned program.—Exploitation of new digital systems such as TARTAR D, Automatic Carrier Landing System (ACLS), Junior Participating Tactical Data System (JPTDS), will be continued to assure maximum utilization of inherent systems capabilities. Continuation of engineering on connection with AN/UYK–7 computer systems, as this computer system is applied to various command and control requirement. Enhancement of support software to accommodate other Navy users and DOD activities.

Program to completion.—Integrate through new digital systems under development software, common hardware, or new system techniques to permit rapid communications and efficient utilization via tactical computer applications.

Resources (In thousands of dollars:)

[In thousands of dollars]

	Fiscal year—			Additional to completion	Total estimated cost
	1971	1972	1973		
R.D.T. & E. funds:					
S3105	$2,450	$2,604	$2,581	(1)	(2)
S3103	1,137	512	0		
Total	3,587	3,176	2,581	(2)	(2)

[1] Continuing.
[2] Not available.

TACTICAL COMMAND AND CONTROL

Chairman ELLENDER. Describe the objectives of this project and tell us what you will do with the $2.6 million you are requesting for fiscal year 1973.

Dr. FROSCH. The objectives of this program are to integrate into various tactical systems (sensor, weapons, and tactical) the capabilities of the AN/UYK–7 general purpose digital computer. The major efforts for fiscal year 1973 are: expansion of computer programs and program compilers integration of communications projects such as tactical satellite and spread spectrum, computer to data display integration and compatibility, and support to NTDS testing.

Senator YOUNG. What are some of the major systems which have benefited from the work done on this project?

Dr. FROSCH. The major systems benefiting from this work are AEGIS, JPTDS, Shortstop, Tartar D.

GYROSCOPE NAVIGATOR

Chairman ELLENDER. $1 million is requested for the advanced development program entitled "Electronically Suspended Gyroscope Navigator." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

NAVIGATION (ADVANCED)

Description.—Develop a precise, invulnerable, self-contained marine inertial navigation system for ships and submarines capable of operating for extended

periods of time (14 days or greater) without reset, [deleted]. The system will use the newly developed Electrically Suspended Gyro (ESG) with its inherent lower drift rates.

Work performed by.—System design, fabrication and software development being done by Honeywell Incorporated, laboratory and at sea testing conducted by Naval Strategic Systems Navigation Facility, Brooklyn, N.Y.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

1. *FY 1971 and Prior Accomplishments:* The Navy developed and demonstrated the Electrically Suspended Gyro monitor system and test results indicated the ESG capable of meeting NAVSHIPS performance goals at sea. The Air Force system was modified, laboratory tested, and resulted in a Navy system that is lighter, smaller, less expensive and able to meet Navy precision navigation requirements.

Fiscal year 1972 program.—Develop program to demonstrate all navigation/reset/calibration modes of the system. Initiate study to extend reset interval beyond 14 days. Procure special gyro test table for further laboratory test and evaluation in preparation for at-sea tests of advanced development model.

Fiscal year 1973 planned program.—Complete programming schedule, commence testing of advanced development model at laboratory and aboard ship. Continue extended reset program.

Program to completion.—After successful advanced development testing, develop and test an engineering development model incorporating latest design information from Air Force and ABM programs. Complete and test extended reset program.

Resources (in thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, $500; fiscal year 1972, $1208; fiscal year 1973, $1016; additional funds to completion are continuing; and the total estimated cost is not available.

GYROSCOPE NAVIGATOR

Chairman ELLENDER. What do you hope to accomplish in this program in fiscal year 1973?

Dr. FROSCH. We expect to complete the development of a computer program that will demonstrate all navigation, reset and calibration modes of the system. Laboratory and at-sea testing of the advanced development model will begin and continue through fiscal year 1973. We intend to continue the effort to develop a reset program that will extend the reset interval beyond 14 days in order to make the system even less dependent upon external navigation systems for reference.

Senator YOUNG. How long do you estimate it will take to complete this program?

Dr. FROSCH. We expect to complete by January 1977.

NUCLEAR VULNERABILITY/SURVIVABILITY

Chairman ELLENDER. [Deleted] is requested for the advanced development program entitled "Nuclear Vulnerability/Survivability". Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

NUCLEAR VULNERABILITY/SURVIVABILITY (ADV)

Description.—The Nuclear Vulnerability/Survivability Program is divided into two projects:

Nuclear Survivability of Ships.—Develop realistic and balanced hardening standards for combat ships in order to increase their survivability in a nuclear

warfare environment. Project includes preparation of a nuclear weapons effects data base, definition of the nuclear threat, vulnerability analysis of ship and its systems, engineering analysis of design modifications required to achieve given levels of balanced hardening.

Nuclear Survivability of Aircraft.—Project will attempt to increase hardness of aircraft systems in a nuclear environment by balancing hardness levels of aircraft subsystems to nuclear weapon effects. To allow orderly development of hardness criteria, the approach will be:

Analyze vulnerability of selected current Navy aircraft to nuclear weapons effects.

Estimate cost to achieve various levels of balanced hardening.

Prepare specifications for designing balanced hardening into future Navy aircraft.

Work performed by.—Naval Ship Systems Command, Naval Ships Engineering Center, Naval Electronics Systems Command, Naval Air Systems Command, Naval Ordnance Laboratory, Naval Research Laboratory, Naval Ships Research and Development Center.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAM:

Fiscal year 1972 program.—Nuclear Warfare Survivability of Ships.—Major effort on the nuclear environment/ship interaction, nuclear damage to systems, and hardening techniques.

Nuclear Survivability of Aircraft.—NONE. Project not funded for fiscal year 1972.

Fiscal year 1973 planned program.—Nuclear Warfare Survivability of Ships.—Completion of tasks started earlier with documentation of results, including hardening standards, issued late fiscal year 1973.

Nuclear Survivability of Aircraft.—Determination of methods and costs of increasing hardness levels will start.

Program to completion.—Nuclear Warfare Survivability of Ships.—Project scheduled for completion FY–74.

Nuclear Survivability of Aircraft.—Methods and costs for achieving various balanced hardening levels will be determined for future aircraft. Specifications to incorporate these standards in future aircraft will be prepared.

Resources. (In thousands of dollars.)

R.D.T. & E.N. funds for fiscal year 1971, $1,075; fiscal year 1972, $702; fiscal year 1973, $1,110; additional funds to completion are continuing; and the total estimate cost is not available.

NUCLEAR VULNERABILITY/SURVIVABILITY

Chairman ELLENDER. Is all of the work on this program performed in Navy in-house facilities?

Dr. FROSCH. No. Approximately $30,000 are provided for employment of a contractor consultant on electromagnetic pulse problems associated with aircraft.

Chairman ELLENDER. Would you please comment briefly on the two projects funded under this program element, and tell us what you hope to accomplish in each of them in fiscal year 1973?

Dr. FROSCH. The Nuclear Survivability of Ships project has proceeded to the point where, during 1973, desired information on the costs or penalties associated with various hardening levels will become available to ship designers and planners. This information will have an important effect on the Navy's decisions to incorporate hardening standards in new ship construction. The parallel project on Nuclear Survivability of Aircraft, because it was not funded in 1972, has not progressed as far as the ship project. We expect to apply the nuclear environment and critical system data base developed earlier in the project to determine aircraft hardening techniques and their associated costs. A major portion of the effort will be concerned with electromagnetic pulse investigation. The goals of both projects are identical: to

provide Navy with hitherto unavailable information on the economic impact of designing tactical Navy systems to operate in a nuclear environment.

Senator YOUNG. Why do you need the increase you are requesting for fiscal year 1973?

Dr. FROSCH. The increase in fiscal year 1973 funds is necessary to insure the timely completion of program objectives. While recognizing the importance of this program, we were not able to fund the aircraft project at all in fiscal year 1972, and the ship project was reduced significantly. The principal portion of the increased funds requested for 1973 will support resumption of work on the aircraft project. The remainder of the fund increase will permit prosecution of the ship vulnerability project at the level of effort planned at program inception.

COMMAND SUPPORT

Chairman ELLENDER. [Deleted] is requested for the program entitled "Advanced Command Support". Has the committee been provided with full details on this program and the projects funded under it?

Dr. FROSCH. Yes, sir.

RADIO SURVEILLANCE (RASUR)

Chairman ELLENDER. [Deleted] is requested for the advanced development program entitled "Radio Surveillance" which is also known as Rasur. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

INTELLIGENCE (ADVANCED)

Description.—RASUR (radio surveillance) provides support for the developmental model of the passive intercept system. [Deleted.]

Work performed by.—Naval Research Laboratory.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—Support of the developmental model will continue. [Deleted.] Definition of parameters for more sensitive intercept models will continue.

Fiscal year 1973 program.—Continue supporting the model technique and capability improvement effort and maintain the integrity of the National Radio Quiet Zone. Plan for the construction of a larger aperture model. [Deleted.]

Program to completion.—Construct the larger aperture model, integrate and debug the subsystems and conduct system performance measurements. Included is continued RDT&E support for the subsystems of the existing developmental model.

Resources. (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, $0; fiscal year 1972, $822; fiscal year 1973, [deleted]; additional funds to completion are continuing; and the total estimated cost is not available.

RADIO SURVEILLANCE

Chairman ELLENDER. Is all of the work on this program performed by the Naval Research Laboratory?

Dr. FROSCH. Most of the work is performed by the Naval Research Laboratory. A small part, less than 5 percent, is for engineering services and commercially available instrumentation obtained on a contract or purchase order basis.

Chairman ELLENDER. Tell us exactly what you plan to do with the funds you are requesting.

Dr. FROSCH. We plan to perform analysis of [deleted]. These are then used to formulate technical requirements for, and conducting of, the research required for further development of this type of instrumentation.

UNDERSEA SURVEILLANCE

Chairman ELLENDER. [Deleted] is requested for the program entitled "Advanced Undersea Surveillance." Give us a brief, unclassified description of this program.

Dr. FROSCH. Advanced undersea surveillance conducts research, development, experiments, and analyses to determine operational usefulness, technical feasibility, and cost of potential undersea surveillance subsystems, then proceeds with performance specifications for development of individual subsystems technically feasible and for which a requirement clearly exists.

Chiarman ELLENDER. Two classified projects entitled "ASW Surveillance" and "Long Range Acoustic Propagation" are funded under this program element. Has the committee been provided with complete details on them?

Dr. FROSCH. Yes, sir.

OTHER MARINE CORPS DEVELOPMENTS

Chairman ELLENDER. $1.7 million is for the program entitled "Other Marine Corps Developments (Advanced)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

OTHER MARINE CORPS DEVELOPMENT (ADVANCED)

Description.—This Program Element provides RDT&E funds for the advanced development of all Marine Corps items except those in the areas of weaponry and vehicles and data systems. In FY 1973, the following seven projects are included in this Program Element:

a. *High energy laser, 1203.*—Potential military application of laser technology includes the use of High Energy Laser devices for [deleted] of certain targets. Thus, this project will be directed toward the development, fabrication and test of experimental equipment to determine the technical feasibility and potential effectiveness of high energy lasers. The development of a transportable [deleted] laser is envisioned.

b. *Tactical exercise simulator/evaluator (TESE), 3102.*—This project will provide a combat simulation model for use in Marine officer professional education systems.

c. *Transportable communications countermeasures system, 3301.*—This program is designed to provide a semi-automatic countermeasure system that will jam multiple frequencies with various modulations in the frequency range used by potential enemies. This system incorporates a single transportable and sheltered antenna system.

d. *Ground radar countermeasures, 3302.*—This program will develop a manpacked system, employed at the infantry battalion level, that is capable of detecting, locating and countering enemy battlefield surveillance radars.

e. *Remote detection and surveillance devices 3602.*—This project will support joint Navy/Marine Corps advanced sensor developments as well as some unilateral Marine Corps testing of sensors that are particularly useful in amphibious warfare.

f. *Amphibious reconnaissance support, 3604.*—Marine reconnaissance units require a variety of specialized equipments to facilitate accomplishment of their role in amphibious operations. This is a composite project designed to provide such items.

g. *Combat surveillance target acquisition system (CSTAS), 3606.*— This project is for the development, test and evaluation of ground based or handheld electro-optic, infrared or radar surveillance devices. The specific equipment to be developed will be determined from an assessment of a Naval Electronics Systems Command Exploratory Development effort initiated in FY 1972. Candidates include a combination light amplification/infrared viewer combining features of the starlight scope and infrared viewer, a lightweight ground based forward looking infrared scanner, and a lightweight long range [deleted] radar.

Work performed by.—a. *High energy laser*—Naval Ordnance Systems Command.

b. *Tactical exercise simulator/evaluator.*—Marine Corps Development Education Command (MCDEC), Quantico, Virginia; Naval Electronics Laboratory Center, San Diego, California; Computer Science Corporation, Santa Monica, California.

c. *Transportable communications countermeasures systems.*—AVCO Electronics, Cincinnati, Ohio.

d. *Ground radar countermeasures.*—Syracuse University Research Corporation, Syracuse, New York and Raytheon Electromagnetic Systems, Santa Barbara, California.

e. *Remote detection and surveillance devices.*—Unilateral Marine Corps testing is accomplished by Marine Corps Development and Education Command (MCDEC), Quantico, Virginia. Joint Navy/Marine Corps activity is managed by the Naval Electronics Systems Command.

f. *Amphibious Reconnaissance Support.*—MCDEC, Quantico, Virginia and Fleet Marine Force personnel.

g. *Combat Surveillance Target Acquisition System.*—MCDEC, Quantico, Virginia.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1971 program.—a. *High Energy Laser (HEL).*—Joint development (Army, Navy, Marine Corps) of the HEL Tactical Weapons design for multi-mission evaluation will be pursued. Engineering design of a Mobile Test Unit incorporating all Services' common requirements and economically unique requirements will be initiated.

b. *Tactical exercise simulator/evaluator.*—Funding is required for technical and analytical research support during Phase II (definition of system characteristics and development of detailed operational specifications for the Marine Amphibious Unit (MAU) combat model) as well as computer time and peripheral equipment rentals necessary to perform the analysis.

c. *Transportable communications countermeasures system.*—Available subsystems will be tested; a full-size, full-frequency range antenna will be fabricated and lab testing of the breadboard system will take place.

d. *Ground radar countermeasures.*—A semi-automatic breadboard model of the system will be fabricated and engineering tests conducted.

e. *Remote detection and surveillance devices.*—Developmental efforts will consist of field tests of selected sensor equipment to determine suitability for Marine Corps use, and, in addition, to determine whether modifications are required for use in amphibious operations. An integrated logistics program will also be developed.

f. *Amphibious reconnaissance support.*—The following equipment, all obtained from commercial sources, will be evaluated: diving equipment, compasses, animal repellant, climbing equipment, parachute equipment and silent outboard motors.

g. *Combat surveillance target acquisition system*—An X-band lightweight medium range radar will be procured and test and evaluation will begin.

Fiscal year 1973 planned program.—a *High energy laser.*—*A* Mobile Test Unit will be fabricated and testing initiated.

b. *Tactical exercise simulator/evaluator.*—A model will be fabricated, software programs will be written and the model tested at the Amphibious Warfare School.

c. *Transportable communications countermeasures system.*—Design of a service test model will be completed and fabrication will begin.

d. *Ground radar countermeasures.*—An engineering model will be constructed and packaged and field testing will be conducted.

e. *Remote detection and surveillance devices.*—The development of sensor and readout devices that will be required during the late 1970's will be initiated. Secial attention will be directed towards equipments in support of amphibious operations to include logistics support and management techniques (trade-off analysis, analysis of training requirements).

f. *Amphibious reconnaissance support.*—Test and evaluation of silent propulsion equipment (electric motors) parachutes and diving equipment will continue.

g. *Combat surveillance target acquisition system.*—Test and evaluation of the long range surveillance radar will continue and the evaluation of a medium range lightweight very high frequency band radar will be initiated.

Program to completion.—a. *High energy laser*—All tests, studies and hardware programs will be continued to culminate in complete system design, operational criteria and overall effectiveness evaluation data.

b. *Tactical exercise simulator/evaluator*—Employment of the Marine Amphibious Unit model (Phase II) will be accomplished by FY 1977. Research required for system expansion to higher and lower command echelons and to perform evaluation of the model's use for application to war gaming will also be pursued in the FY 1974–FY 1976 time frame.

c. *Transportable communications countermeasures system*—Development of the Service test model will be completed during FY 1974, with testing to be completed during FY 1975. Continued development, to include data packaging, will conclude with procurement scheduled for FY 1978.

d. *Ground radar countermeasures.*—Projected milestones include development of a service test model during FY 1975 with service tests in FY 1976.

e. *Remote detection and surveillance devices*—The development stated in FY 1973 will provide test equipments for major service test (FY 1975) and adaptation of other service developed equipment as necessary.

f. *Amphibious reconnaissance support*—This is an open-ended project intended to satisfy continuing requirements of the nature previously discussed.

g. *Combat surveillance target acquisition system*—Additional Advanced Development projects to develop specific equipments may be initiated based upon this program and on information resulting from exploratory development in this area.

Resources (in thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, $2784; fiscal year 1972, $3125; fiscal year 1973, $1,700; additional funds to completion are continuing; and the total estimated cost is not available.

Other Marine Corps Developments

Chairman Ellender. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

General Brooks. I will be glad to do so.

(The information follows:)

OTHER MARINE CORPS DEVELOPMENTS (ADVANCED)

[In thousands of dollars]

		Fiscal year—		
		1971 actual	1972 estimate	1973 estimate
C1203	High energy laser			300
C3102	Tactical exercise simulator and evaluator (TESE)		1,900	500
C3111	Position location reporting system (PLRS)	705		
C3112	Tactical warfare analysis and evaluation system	500		
C3301	Transportable communications countermeasures system	447	200	400
C3302	Ground radar countermeasures	100	75	100
C3602	Remote detection and surveillance devices	294	250	250
C3603	Tactical lightweight drone reconnaissance system		150	
C3604	Amphibious reconnaissance support system	49		50
C3606	Combat surveillance target acquisition system		500	100
C3607	Lightweight hostile weapons locator	689		
C3609	Swimmer propulsion unit		50	
	Total	2,784	3,125	1,700

Chairman ELLENDER. Are you requesting funds for any more projects in fiscal year 1973? If so, please describe them briefly.

General BROOKS. The high energy laser project is the only one appearing in this program element far the first time in fiscal year 1973. It will be directed toward the development, fabrication, and test of experimental equipment to determine the chemical feasibility and potential effectiveness of high energy lasers. In fiscal year 1973, a mobile test unit will be fabricated and testing initiated.

Chairman ELLENDER. What are the major efforts you plan to pursue in fiscal year 1973?

General BROOKS. The largest effort to be undertaken in this element in fiscal year 1973 is the tactical exercise simulator/evaluator (TESE) for which we are requesting $500,000. The TESE project will provide a combat simulation model for use in Marine officer professional education systems. In fiscal year 1973, a model will be fabricated, software programs written and the model tested at the Amphibious Warfare School.

Senator YOUNG. I note that your request for fiscal year 1973 is approximately $1.4 million less than the amount provided for fiscal year 1972. Please comment on this large decrease.

General BROOKS. This decrease is primarily attributable to a reduction in the funds requested for the tactical exercise simulator/evalutor, $1,900,000 in fiscal year 1972 versus $500,000 in fiscal year 1973. Fiscal year 1972 funding provided for technical and analytical research support during phase II (definition of system characteristics and development of detailed operational specifications for the marine amphibious unit (MAU) combat model) as well as computer time and fiscal year 1973 effort, which I discussed in answer to your previous question and which will utilize the results of the previous effort, requires only the $500,000 requested.

MARINE CORPS DATA SYSTEMS

Chairman ELLENDER. $4 million is requested for the advanced development program entitled "Advanced Marine Corps data systems". Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Marine Corps Data Systems (Advanced)

Category: Advanced Development

Budget Activity: 7-Other Equipment

DESCRIPTION: This Program Element, newly established in FY 1973, provides RDT&E funds for advanced development related to Marine Corps data systems. In FY 1973, the following three projects are included in this Program Element:

a. Marine Tactical Command/Control System (MTACCS), 3101 - The MTACCS concept envisions air/ground tactical command and control systems integrated to the maximum extent possible and oriented toward the amphibious environment to meet the unique requirements of Landing Force Commanders in the 1978-1988 era. The implemented concept will consist of a family of modular computer, display and communications equipments which could be readily configured for specific operational situations and mounted in shelters especially adapted to the amphibious environment. The mission and tasks to be performed by MTACCS are grouped into seven functional areas: (1) Marine Integrated Fire and Air Support System (MIFASS); (2) Tactical Combat Operations System (TCO); (3) Marine Integrated Personnel System (MIPS); (4) Marine Integrated Logistics System (MILOGS); (5) Tactical Air Operations System (TAO); (6) Communications; and (7) Marine Air/Ground Intelligence System (MAGIS).

b. Marine Integrated Fire and Air Support System (MIFASS), 3103 - This project will provide automation aids to those functions currently performed in the Direct Air Support Center, Fire Support Coordination Centers, and the Fire Direction Centers within a Marine Amphibious Force/Marine Division. The system will consist of a family of MTACCS modular computer, display and communications equipment which can be readily configured for specific operational situations and mounted in shelters especially adapted to the amphibious environment.

c. Tactical Combat Operations System (TCO), 3104 - This program will develop a system which will expedite staff functions within a Marine Amphibious Force down to a Battalion/Squadron level. The TCO system will consist of a family of MTACCS modular computer, display and communications equipment which could be readily configured for specific operational situations and mounted in shelters especially adapted to the amphibious environment. It appears that the TCO will be able to utilize MIFASS computer centers.

WORK PERFORMED BY: Marine Tactical Command and Control System (MTACCS) and Marine Integrated Fire and Air Support System (MIFASS) work is being performed by Hughes Aircraft Company, Fullerton, California and the Marine Corps Development and Education Command (MCDEC), Quantico, Virginia.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program: Activities related to the MTACCS concept are funded under the MTACCS line item in FY 1972. The MIFAS System is in test bed for evaluation during this fiscal year and FY 1973. This first system is anticipated as the most complex. Evaluation procedures and solutions to problems developed during

this phase will facilitate the test bed evaluation for subsequent MTACCS systems. The test bed is expected to be fully operational by March 1972.

FY 1973 Planned Program: Beginning in FY 1973, funding for the MTACCS concept and funding for the various systems to be defined and developed thereunder will be separately identified.

a. Marine Tactical Command and Control System (MTACCS) - Funds under the MTACCS concept line item are for support of the test bed and costs common to the systems to be defined and developed thereunder.

b. Marine Integrated Fire and Air Support System (MIFASS) - FY 1973 funding will provide for lease of test bed equipment, contractor support, maintenance support and modifications to the test bed. The integration or relationship of MIFASS to the Marine Air/Ground Intelligence System, to Tactical Fire (TACFIRE), Tactical Operation System (TOS) and to the semi-automated Direct Air Support System must be fully clarified.

c. Tactical Combat Operations System (TCO) - The TCO application programs based on the technical system model will be developed in preparation for the test bed evaluation of TCO. Hardware and software modification will be required to reconfigure the test bed for the evaluation of TCO. Specialized TCO simulation programs in support of the revised test bed will be developed.

Program to Completion:

a. Marine Tactical Command/Control System (MTACCS) - Funds under the MTACCS concept line item will support costs common to the systems to be defined and developed thereunder. By present estimates, the entire integrated MTACCS will be introduced to the Fleet Marine Force in the early 1980's.

b. MIFASS - The MIFAS System will be in test bed for evaluation during FY 1973 and FY 1974. At the end of FY 1974, an engineering development contract will be let for the Service Test Model of the MIFAS System with service test scheduled during FY's 1977 and 1978.

c. TCO System - TCO will enter the test bed evaluation phase in FY 1974. A period of overlap with MIFASS in test bed will serve to identify the integration of these two MTACCS systems. Principal FY 1974 and 1975 costs will involve reconfiguration of the test bed as necessary, lease of test bed equipment and contractor support to the test bed. TCO will complete test bed evaluation in FY 1975 and the specifications for the system must be refined and militarized. As this information is developed, it will be incorporated into the MIFASS contract definition so that the MIFASS service test model (STM) will accommodate the TCO System. Development of the software programs for an operational TCO will be conducted concurrently with procurement of the STM over FY's 1976 and 1977.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	2498	2950	4000	Continuing	NA

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Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

General BROOKS. I will be glad to do so.

(The information follows:)

MARINE CORPS DATA SYSTEMS (ADVANCED)

[In thousands of dollars]

		Fiscal year—		
		1971 Actual	1972 estimate	1973 estimate
C3101	Marine Tactical Command control system (MTACCS)	2,498	2,950	1,200
C1303	Marine integrated fire and air support system (MIFASS)			1,300
C1304	Tactical combat operations (TCO) system			1,500
	Total	2,498	2,950	4,000

Senator YOUNG. I note in the descriptive summary that this is an entirely new program element. Why was it established?

General BROOKS. This program element was established to provide for the advanced development of Marine Corps data systems. As these systems are growing in number and dollar value, it seemed advisable to segregate them for better visibility and for managerial purposes.

Chairman ELLENDER. Where were the projects included in your fiscal year 1973 program funded in fiscal year 1972?

General BROOKS. The only project appearing in fiscal year 1973 which was also funded in fiscal year 1972 is the Marine Tactical Command/Control System. In fiscal year 1972, accounting for this project was done under program element 63710M, other Marine Corps advanced development support.

Chairman ELLENDER. Why do you need the increase of $1.1 million you are requesting for fiscal year 1973?

General BROOKS. Two of seven functional integrated automation systems under the Marine Tactical Command/Control System concept will begin development in fiscal year 1973 under this program element. They are the Marine Integrated Fire and Air Support System (MIFASS) and the Tactical Combat Operations (TCO) System. The increase in funding will be applied to these programs.

HUMAN RESOURCES

Chairman ELLENDER. $4.3 million is for the continuing advanced development program entitled "Human Resources (Advanced)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

HUMAN RESOURCES (ADVANCED)

Description.—This research contains three active projects, Education and Training Development, Manpower Management Effectiveness, and Human Technology. Under these three broad areas there are a variety of developmental subprojects, each being conducted in response to promulgated R.D.T. & E. requirements within the broader project title area. Each project and its subordinate

sub-projects require developmental progress which will improve and enhance technologies either now being implemented or to be introduced as operational capabilities in these areas of Naval Management.

Work performed by.—Naval Personnel Research Training and Development Laboratories, Naval Air Development Center, Naval Electronics Laboratory, Naval Aerospace Medical Research Laboratory, Naval Training Device Center and contractor support.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 programs.—Much realignment of sub-prejects under project headings has occurred due to budgetary constraints. Effort continues towards priority sub-project completions, at a slower pace, while some sub-projects have been shelved pending availability of funding, via sub-project completions or via increased fundings. All Advanced Development Objectives stated as requirements to R.D.T. & E. ADO documentation will be reviewed, and revised to reflect rank-order priorities for application of effort and funding. Continued progress will be made on solution of project programs which must be resolved in the people areas as we plan for the navy of the 1980's.

Fiscal year 1973 planned program.—Efforts will continue towards sub-project completion on those priority items reflected by the reordering of requirements noted above. Operational implementation of completed sub-projects advancements shall continue.

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, $3,576; fiscal year 1972, $4,024; fiscal year 1973, $4.264; additional funds to completion are continuing; and the total estimated cost is not available.

HUMAN RESOURCES

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. Yes, sir.

(The information follows:)

63770N—HUMAN RESOURCES (ADVANCED)

[In thousands of dollars]

		1971	1972	1973
P–43–03	Education and training development	1,759	1,706	1,505
M–43–03	Education and training development	581	681	569
P–43–07	Manpower effectiveness	886	1,133	1,681
W–43–13	Human factors technology	350	504	509
Total		3,576	4,024	4,264

Chairman ELLENDER. I note that you are requesting funds for two projects, both of which are entitled "Education and Training Development." For one you are requesting $569,000 and for the other $1.5 million. Please comment on this.

Dr. FROSCH. Yes, sir. Project M–43–03 with the request of $569,000 is assigned to the Bureau of Medicine and Surgery for development of education and training techniques unique to the medical department. The other project, P–43–03, is assigned to the Bureau of Naval Personnel for development efforts applicable to the surface, subsurface, and aviation areas.

Senator YOUNG. Describe what you hope to accomplish in this program in fiscal year 1973.

Dr. FROSCH. Yes, sir. The major thrusts of each of the four projects in this program will provide R.D.T. & E. products in response

to priority R.D.T. & E. requirements of the principal consumers, in this case the Chiefs of Bureaus, and the Chief of Naval Training.

MEDICAL DEVELOPMENT

Chairman ELLENDER. $4.3 million is requested for the program entitled "Advanced Medical Development." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Medical (Advanced)

Category: Advanced Development

Budget Activity: 7-Other Equipment

DESCRIPTION: Advanced development of medical care and health maintenance systems, medical systems to support crew/troop performance effectiveness, and disease and injury prevention and control systems. The element consists of three projects:

(1) Advanced Medical Development: The project is a composite of indirectly related tasks encompassing advanced development components too small to be carried as separate project line items. It includes: (1) Methods for long term preservation of human tendon, nerve, and other tissues for use in repairing combat injuries, guidelines for treatment of severe traumatic shock, and improved methods for processing frozen blood, (2) Methods for improving medical history, clinical laboratory diagnosis, medical services and medical data processing, (3) Criteria predictive of success/failure of psychiatric patients returned to duty, (4) Personnel screening criteria for special military duty, methods for predicting effects of work-rest-sleep cycles, and crew fitness monitoring methods. Aviator disorientation screening methods and criteria for pilot success in aircraft carrier landing, (5) Field testing meningococcus vaccines and evaluating various methods of influenza immunization. Testing effectiveness of barracks humidification and air-recirculation in control of acute respiratory disease.

(2) Amphibious Medical Support System: The project attacks many new problems in development of an amphibious medical support system under four categories: (1) Casualty Receiving Facilities - includes systematic analysis of existing and planned ships to locate space suitable for supporting the casualty load, design of class A shock protection for vital medical equipment, and adaptation of field facilities to dual afloat-ashore capability. (2) Patient Movement Vehicles - includes protection of patients from vibration and slam, vehicle movement control, and patient distribution. (3) Amphibious Medical Care - includes improved patient handling equipment and techniques and adaptation of current and new equipment and procedures to amphibious ships. (4) Amphibious Medical Logistics - includes improved rapid on-call deployment of medical/surgical teams and equipment, consolidated Navy/USMC medical supply system to permit afloat or ashore deployment and adaptation of amphibious force data processing systems to provide medical information.

(3) Air Crew Impact Injury Prevention: The purpose of the Impact Injury Prevention Program is to develop criteria for the construction of manlike test devices based on man's physical response to impact acceleration and to determine what portions of that response are injurious. The application of these criteria to the design and evaluation of protective devices is to be demonstrated.

WORK PERFORMED BY: Naval Bureau of Medicine and Surgery

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM:

FY 1972 Program:

Initiate evaluation of the effectiveness of controlled humidification and air recirculation in barracks in reducing transmission and incidence of acute respiratory disease in Marine Corps recruits. Complete validation of psychiatric screening method for Antarctic duty. Continue development carrier landing evaluation criteria and aviator disorientation screening method. Complete field trials Group A meningococcic vaccine in Africa. Continue evaluation of nerve and tendon grafts and immune suppression methods. Initiate evaluation of computer-assisted system for health care delivery. Follow-on testing of shipboard utility of Medical Unit Self-contained Transportable (Army MUST System); improved Guide for Medical Personnel Augmenting Fleet Marine and Amphibious Forces; Development of Modular Field and Shipboard Medical Facilities; Hardening and Protecting Medical/Dental Equipment Aboard Ship; Acclimatization of Troops in Shipboard Environment; Systematic Analysis of Present and Future Roles and Capabilities of Seabased Major Casualty Receiving Facilities for Amphibious Warfare; Baseline Medical Capability Survey and Inventory of the Ships of the Amphibious Forces, U. S. Pacific Fleet and update and revision of similar study of the Atlantic Fleet; Protection of Patients/Vital Medical Equipment from Shock/Vibration in Ambulance Craft/Casualty Recovery Ships; Amphibious Transport Dock (LPD) Medical Spaces Study. The design of the data collection system for the established new facilities at Michoud Station have been finalized and a data acquisition system is being procured. An Urgent Minor Military Construction Project has been approved for the installation of the new accelerator. Approximately $300,000 in unused NASA equipment has been made available to the program on loan. Contemplated work for the remainder of this Fiscal Year includes the development and validation of a 3-dimensional data system and man rating of the accelerator. Approximately 100 instrumented human runs are contemplated for this year.

FY 1973 Planned Program:

Complete testing Group A meningococcal vaccine. Initiate development of procedures for transplantation of joints. Evaluate cost effectiveness of computer recording of dental examination. Develop actuarial guidelines for management and disposition of psychiatric patients. Continue evaluation of computer-assisted system for health care delivery. Complete development carrier landing evaluation criteria. A design study for Medical/Dental Spaces in Amphibious Cargo Ships (LKA); Shock/Resuscitation Unit (portable) Study, for use by Marine Shore Party; Development of Simulation Modules and Determination of Patient Tolerances for Vibration; Development of medical evacuation equipment requirements for Navy and Marine Corps helicopters; Ruggedization of selected Medical/Dental Equipment including design of Prototype Shock/Vibration Mountings for use aboard ship; Develop effective training techniques for various types of Surgical Teams including Casualty Regulating; Complete development of Heat Acclimatization Tables for shipboard use by Marines in Amphibious Operations; Develop Casualty Treatment Data System for interface with tactical data systems; Develop responsive combat factored Medical Supply System; Complete Surgical Support Team Supply Block Study, Neurosurgical Team Supply Block Study and Disaster Supplement Block Study. FY 73 funds have been increased to $1,000,000 since this is the first full year in which all necessary equipment, test subjects and facilities ..

will be available. A minimum of 1,000 runs using human volunteer subjects and/or human analogs is contemplated during this year. During FY 73 a full staff of approximately 21 civil service scientists, engineers and technicians, 5 active duty Navy military personnel and 21 Army enlisted personnel (test subject) is contemplated. This staff will not markedly change in size for the duration of the program.

Program to Completion:

Develop general hospital capability for procurement and utilization of frozen blood components and preserved human tissues. Develop multipurpose surgical treatment unit. Develop rapid diagnostic and control system for infectious disease agents. Develop reliable crew/troop performance prediction, maintenance and enhancement capability. Develop an integrated mobile amphibious warfare medical support system. Develop an integrated biomedical data system capable of reliably predicting impact effects and evaluating the comparative effectiveness of protection systems.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	3,000	3,189	4,294	Continuing	N.A.

MEDICAL DEVELOPMENT

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

[In millions of dollars]

	Fiscal year—		
	1971	1972	1973
Program element: Medical (ADV):			
Project:			
Advanced medical development	2.8	2.4	2.4
Amphibious medical support system		.2	.7
Aircrew impact injury prevention	.2	.5	1.0

Chairman ELLENDER. What relationship, if any, has this program to the project entitled "Medical support" that we discussed earlier?

Dr. FROSCH. The medical development program is generally in response to medical problems areas which have been identified and analyzed in some depth under the Navy medical support capability studies and analysis support project.

Senator YOUNG. What need do you have for the increase of $1.1 million you are requesting?

Dr. FROSCH. The increase is to provide the funding required to carry out the plans for the projects (1) amphibious medical support system and (2) aircrew impact injury prevention. The funding requested is based on development plans intended to achieve their objective within an appropriate time frame. Each project will be increased approximately $0.5 million which will allow the projects to achieve an acceptable level of effort and allow them to meet development milestones on schedule.

Chairman ELLENDER. What are the major efforts you will be working on in fiscal year 1973?

Dr. FROSCH. In the project advanced medical development we will continue meningitis vaccine work, initiate work on transplantation of preserved joints, develop actuarial guidelines for management of psychiatric patients, and evaluate computer assisted health care delivery systems. The project on amphibious medical support will work on improved shipboard medical facilities, advanced development of a portable closed cycle respirator will be completed, and shipboard and helicopter-borne equipment will be ruggedized. Heat acclimatization tables for shipborne marines will be completed, and special medical support team studies will be carried out. In the project on aircrew impact injury prevention the new simulation facility at Michoud will be in full-time operation. A minimum of 1,000 runs is anticipated with the provision of much new biomedical data for use in design and evaluation of air, water, and landborne vehicular protective systems.

OCEANOGRAPHIC SYSTEMS

Chairman ELLENDER. Of the total requested for other equipment, $7.4 million is for the program entitled "Advanced oceanographic

systems." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

OCEANOGRAPHIC SYSTEMS (ADVANCED)

Description.—Element composed of 10 projects, of which six are funded in FY 1973. Funded projects are: (a) Bottom Topographic Survey System (BOTOSS); (b) Portable Oceanographic Survey System (POSS); (c) Submarine Location, Escape and Rescue (RECUE); (d) Large Object Salvage System (LOSS); (e) Surface Supported Diving System (SFC DIVE); and (f) NR–1 [deleted.] Projects not funded in FY 1973 but funded in FY 1974 are: (a) Hydrographic Survey and Charting System (HYSURCH); (b) Integrated Geophysical Survey System (GEOSS); (c) Extended Salvage Depth Capability (LOSS DEEP). Completed project is Location Aid Device (LAD). Brief project descriptions are:

BOTOSS.—Develop sonar array sounding system for installation on AGS–26 through AGS–21 class ships to collect precise deep ocean bathymetric data.

POSS.—Develop oceanographic instruments to improve environmental data collection capability to support Fleet requirements.

Rescue.—Develop techniques/systems to permit escape/rescue of surviving personnel from distressed submarines; includes Deep Submergence Rescue Vehicle development and testing.

Loss.—Develop capability to recover large objects (1,000 tons) from continental shelf depths.

SFC Dive.—Develop equipment/techniques to increase safety and improve capabilities for unsaturated dives to 300 foot depths—includes 90 percent of range/type of diving now done by Navy.

NR–1.—[Deleted.]

HYSURCH.—Develop system for increasing rate and accuracy of coastal hydrographic surveys to support amphibious, mine warfare, shore bombardment and other Fleet operations.

GEOSS.—Integrate advanced sensors and data processors into a surveying system for rapid acquisition of geophysical data used to describe earth's magnetic and gravitational fields.

Loss Deep.—Develop equipment/techniques to recover large objects from 850 feet to 20,000 feet through incremental increases in capability.

LAD.—Develop device for attachment to objects subject to loss at sea to assist in location to permit recovery.

Work performed by.—Bottom Topographic Survey System (BOTOSS).—Applied Research Laboratories, Austin, Texas; Navy Undersea Research and Development Center, San Diego, California.

POSS.—Naval Oceanographic Office, Suitland, Maryland.

Rescue.—Naval Ship Research and Development Center, Annapolis, Md.; Naval Undersea Research and Development Center, San Diego, Calif.; Lockheed Missiles and Space Co., Sunnyvale, Calif.; Massachusetts Institute of Technology.

Loss.—Naval Ship Research and Development Laboratory, Panama City, Florida; Naval Civil Engineering Laboratory, Port Hueneme, Calif.; Naval Undersea Research and Development Center, San Diego, Calif.

SFC Dive.—First funding in FY 1973. Will be managed in Naval Ship Systems Command.

NR–1 [Deleted]—Electric Boat Division of General Dynamics Corp.; Naval Ship Engineering Center; Naval Ship Research and Development Center, Annapolis, Md.

Hydrographic survey and charting system (HYSURCH)—U.S. Naval Oceanographic Office, Suitland, Md.; Kollsman Instrument Corporation, Soyosset, N.Y.; Decca Survey Systems, Inc., Houston, Texas; Uni-Flyte, Bellingham, Washington; Massachusetts Institute of Technology; Naval Air Development Center, Johnsville, Pennsylvania.

Integrated geophysical survey system (GEOSS)—U.S. Oceonographic Office.

Extended salvage depth capability (LOSS DEEP—First funding FY 1974; will be managed in Naval Ship Systems Command.

Location aid device (LAD)—Naval Ordnance Laboratory, White Oak, Md.; Bunker Ramo.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—Bottom topographic survey system (BOTOSS)—Analytical design completed July 1971. Laboratory design tasks assigned. Integrated Logistics Support plan scheduled completion 3rd Qtr. System design plus complete data package and system/subsystem specifications to be completed 4th Qtr.

Portable oceanographic survey system (POSS)—Not funded FY 1972.

Submarine location, escape and rescue (RESCUE)—Deep Submergence Rescue Vehicle I accepted by Navy 6 Aug. 1971; placed "in service, special" by Chief of Naval Operations; mated with mother submarine at sea and dry transferred personnel. Testing with mother submarine will continue.

Large object salvage system (LOSS)—Conducted at sea tests of 100 ton (lift) pontoon using compressed air to dewater pontoon. Tested explosive stud attachment devices and controlled lift techniques.

Surface supported diving system (SFC DIVE)—Not funded FY 1972.

NR–1 [Deleted] Construct operational system and install on NR-1.

Hydrographic survey and charting system (HYSURCH)—Not funded FY 1972. Contractor continuing work on Advanced Development Model with FY 1971 funds.

Integrated geophysical survey system (GEOSS)—Not funded FY 1972.

Extended salvage depth capability (LOSS DEEP)—Not funded FY 1972.

Location aid device (LAD)—Project completed; not funded FY 1972.

Fiscal year 1973 planned program.—BOTOSS—Award contract for construction of service test model.

POSS—Complete systems analysis on major equipments and draft engineering specifications. Continue coordination with National Oceanic and Atmospheric Administration on development of an expendable salinity, temperature, depth probe and recorder.

RESCUE—Conduct tests of Deep Submergence Rescue Vehicles (DSRV) with new submarine rescue ships (ASRs). Test alternate mission equipment. Prepare for first major availability of DSRV–1.

LOSS—Conduct at-sea tests with 100 ton lift pontoon using liquid nitrogen and hydrazine dewatering systems. Lifting tests to be conducted at various depths from 150 feet to 500 feet using these dewatering systems and compressed air.

Surface supported diving system (SFC DIVE).—Prepare Technical Development Plan and begin writing of contract specifications for service test models of system components.

NR–1 [deleted].—Conduct operational at-sea tests [deleted].

Hydrographic survey and charting system (HYSURCH).—Not funded FY 1973.

Integrated geophysical survey system (GEOSS).—Not funded FY 1973.

Extended salvage depth capability (LOSS DEEP).—Not funded FY 1973.

Location aid device (LAD).—Project completed.

Program to completion.—Bottom topographic survey system (BOTOSS)—Complete development of sounding array and install aboard AGS–26 class ship for integration with navigation and recording equipment for at-sea testing in FY 1975.

Portable oceanographic survey system (POSS).—Complete development of the system, on a modular basis, to permit employment of individual modules as they become available. Total system will not be complete until late 1970s.

Submarine location, escape and rescue (RESCUE).—Initial DSRV Fleet support planned for June 1974. Testing of secondary mission (search) equipment will continue through FY 1975 and be completed FY 1976.

Large object salvage system (LOSS).—Fabrication and certification of all major components will be completed FY 1975 with system assembled and evaluated in FY 1976 and final reports, specifications completed FY 1977.

SFC dive.—Delivery and testing of individual components will begin in FY 1975 and continue through FY 1978. Final documentation will be complete FY 1980.

NR–1.—Project complete FY 1973.

HYSURCH.—Restart project FY 1974; completed development of the [Pulsed Laser] Airborne Depth Sounder, small high-speed sounding boat and multi-color dry process chart copier for shipboard use. Integrate and install complete system on a coastal survey ship for at-sea tests FY 1977.

GEOSS.—Restart project FY 1974; develop computer programs for shorebased facility, select and obtain gravity meter, magnetometer, fathometer, navigation and peripheral equipment—assemble and test equipment and install on ship and conduct field tests FY 1977.

Loss Deep.—Initiate project FY 1974—specific plans will be in TDP and will include unmanned work system for attaching lifting devices to objects in deep water, deep depth buoyancy systems, etc.

Resources—In thousands of dollars:

R.D.T. & E.N. funds for fiscal year 1971, $6,938; fiscal year 1972, $8,084; fiscal year 1973, $7,386; additional funds to completion are continuing; and the total estimated cost is not available.

OCEANOGRAPHIC SYSTEMS

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts provided for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

FUNDING

Project	Fiscal year— 1971	1972	1973
Bottom topographic survey subsystem [1]	$293,000	$657,000	$2,864,000
Portable oceanographic survey system [1]	108,000		218,000
Hydrographic survey and charting system [1]	550,000		
Submarine location, escape, and rescue	5,190,000	3,989,000	3,030,000
Large object salvage system	497,000	458,000	724,000
Location aid device	300,000		
Surface supported diving system			50,000
NR–1		3,700,000	500,000

[1] To be transferred to the Defense Mapping Agency (DMA) in fiscal year 1973.

Chairman ELLENDER. Of the total requested for oceanographic systems, $3 million is for the project entitled, "Submarine location, escape, and rescue." Please give us a brief description of this project and tell us what you hope to accomplish in fiscal year 1973.

Dr. FROSCH. This project has funded the design and construction of the deep submergence rescue vehicle (DSRV). We have two of these rescue vehicles, one has been accepted by Navy and is undergoing Navy testing, the second and final one which was funded under OPN is undergoing testing by the manufacturer. When these vehicles become operational they will provide us with a capability to rescue personnel from submarines which are in distress above their collapse depth. Our fiscal year 1973 plans call for continued at-sea testing of the DSRV No. 1 and DSRV No. 2 in addition to testing of two new catamaran ASR's which have been built as support ships for the DSRV's.

Senator YOUNG. You are requesting $50,000 for what appears to be a new project entitled, "Surface supported diving system." Please comment on this project.

Dr. FROSCH. We have an established program of exploratory development to improve our diving capability. In the past few years, with your support, we have pursued development of a saturated diving capability for deeper depths. We have not, however, attacked the problems attendant to shallow water nonsaturated diving. The standard fleet diving equipment in the Navy primarily consists of equipment designed nearly a half century ago. We should bring modern technology into this important area to improve both the safety and efficiency of the Navy's working divers. This modest program will be aimed at this goal. This proposed advanced development project will improve our nonsaturated diving capability at the shallower depths.

OCEANOGRAPHIC ENGINEERING TECHNOLOGY

Chairman ELLENDER. Of the total requested for other equipment, $9.7 million is for the program entitled "Advanced oceanographic engineering technology." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

OCEAN ENGINEERING TECHNOLOGY (ADV)

Description.—Element composed of four projects which are: (a) Deep Submergence Bio-Medical Development (BIOMED); (b) Man-in-the-Sea, Continental Shelf (MIT–CS); Man-in-the-Sea, Deep Ocean (MITS–DO) and; Deep Ocean Technology (DOT). Brief project descriptions are: *BIOMED:* An integrated program to provide new or improved procedures, standards, techniques, equipment, materials and facilities which support health maintenance, medical care and personnel selection and performance in manned deep submergence operations. *MITS–CS:* Intended to provide the capability to enable divers to perform useful work in the oceans down to continental shelf depths for extended periods of time. *MITS–DO:* First funding FY 73. Intend to extend diver work capability to depths below continental shelf depth through development of diver life support equipment. *DOT:* A broad based program to provide advanced undersea technology necessary to support future Navy developments in undersea systems.

Work performed by.—BIOMED: Naval Medical Research Institute, Bethesda, Maryland; Submarine Medical Research Laboratory, Groton, Connecticut; University of Pennsylvania, Philadelphia, Pennsylvania; Duke University, Durham, North Carolina; State University of New York at Buffalo, Buffalo, New York; Ocean Systems, Tarrytown, New York; Virginia Mason Research Institute, Seattle, Washington; University of Hawaii, Honolulu, Hawaii. *MITS–CS:* Naval Ship Research and Development Laboratory, Panama City, Flarida; Navy's Experimental Diving Unit, Washington, D.C.; Naval Undersea Research and Development Center, San Diego, California; General Dynamics Electric Boat Division, New London, Connecticut; Westinghouse Electric Corporation, Annapolis, Maryland; and General Electric Corporation, Philadelphia, Pennsylvania, have been or are currently involved. *MITS–DO:* FY 73 first year funded. *DOT:* Principle Navy Laboratories are, Naval Ship Research and Development Center, Annapolis, Maryland; Naval Civil Engineering Laboratory, Port Hueneme, California; Naval Undersea Research and Development Center, San Diego, California; Naval Undersea Systems Center, New London, Connecticut; Industrial contractors include General Dynamics, Groton, Connecticut; Southwest Research Institute, San Antonio, Texas; Ocean Science and Engineering, Long Beach, California; E. G. & C. International, Waltham, Massachusetts; Chesapeake Instruments, Annapolis, Maryland; Penberthy Glass Company, Seattle, Washington.

Program accomplishments and future programs

Fiscal year 1972 program.—Deep Submergence Bio-Medical Development: Continue longitudinal health study of divers; evaluate new methods of *in vivo* bubble detection and therapy for decompression sickness; determine depth limitations imposed upon man by increased respiratory resistance of breathing dense gases; evaluate methods of prevention and treatment of hearing loss in divers; determine thermal and humidity requirements of diver breathing gases for very deep dives. *Man-in-the-Sea; Continental Shelf:* Complete operational readiness testing of prototype Deep Dive System and demonstrate suitability of IX–501 as a training ship. Conduct system definition phase for new aquanaut equipment system. *Man-in-the-Sea, Deep Ocean:* FY 73 first year funded. *Deep Ocean Technology:* Certify titanium pressure hull to be installed in the ALVIN deep submergence vehicle; fabricate 9,500 psi sea water variable ballast system for installation on ALVIN; complete underwater construction experiments at 600 foot water depth. [Deleted.] Complete engineering design and begin fabricating the 20,000 foot remote unmanned work system.

Fiscal year 1973 planned program.—Deep Submergence Bio-Medical Development: Continue studies initiated previously including work on decompression schedules; diagnosis and treatment of decompression sickness and oxygen toxicity, and use of transcutaneous bubble detector suitable for Fleet use. *Man-in-the-Sea,*

Continental Shelf: Transfer the training ship (IX–501) with installed Deep Diving System to Bureau of Personnel as a dedicated training platform. Initiate development of Integrated Aquanaut Equipment System including life support equipment, thermal protection and diver communications. *Man-in-the-Sea, Deep Ocean:* Prepare a Technical Development Plan which will be oriented towards supporting the project being initiated in FY 74 which addresses deep ocean salvage. *Deep Ocean Technology:* Complete operational evaluation of ALVIN as a 12,000 foot deep submergence vehicle. Evaluate remote unmanned work system components including power system, buoyancy, and multiplex cable subsystem. Demonstrate, in situ, a family of highly efficient anchors, cables [deleted]. Demonstrates remote imaging system [deleted]. Initiate 3,000 foot depth underwater construction experiment. Fabricate a non-penetrator non-umbilical [deleted] command and control system.

Program to completion.—Deep Submergence Bio-Medical Development: Extend the sum of physiologic knowledge of effects of prolonged exposure to high pressure using improved physiologic monitoring equipment; initiate new developments resulting from ongoing efforts. Determine man's physiologic limiting depths. *Man-in-the-Seat, Continental Shelf:* Proceed with development of complete aquanaut equipment to support working dives to continental shelf depths at as rapid a pace as funding permits. *Man-in-the-Sea, Deep Ocean:* With bio-medical support provided by Deep Submergence Bio-Medical Development project of Bureau of Medicine, this project will develop diver equipments, techniques, and hardware systems to permit man to dive to his physiological death limit. *Deep Ocean Technology:* Platforms and projects of opportunity will be utilized for demonstrations in the ocean environment including: ALVIN; Deep Submergence Rescue Vehicles; TRIESTE; NR–1; remote unmanned work system; acoustic and surveillance experiments; search and recovery operations; other advanced weapons. Technology goals include: competing fabrication of a 20,000 foot depth remote unmanned work system; [deleted] demonstrating automatic anchor and winch for deep ocean systems; demonstrating underwater mooring and launch system; demonstrating an underwater construction capability at 6,000 foot depth; [deleted].

Resources (in thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, 9,543; fiscal year 1972, 8,939; fiscal year 1973, $9,720; additional funds to completion are continuing; and the total estimated cost is not available.

OCEANOGRAPHIC ENGINEERING TECHNOLOGY

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the estimate for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

FUNDING

Project	Fiscal year—		
	1971	1972	1973
Deep submergence biomedical development	$2,495,000	$2,856,000	$2,834,000
Man-in-the-sea, Continental Shelf	1,620,000	502,000	409,000
Man-in-the-sea, deep ocean [1]			150,000
Deep ocean technology	5,428,000	5,581,000	6,327,000

[1] Program terminated April 1972.

Chairman ELLENDER. I note you are requesting $150,000 for what appears to be a new project entitled "Man-in-the-sea, deep ocean." Please comment on this project and its objectives.

Dr. FROSCH. Our past efforts in our man-in-the-sea program have aimed toward a capability of working on the Continental Shelf; that is, to depths of about 600 feet. We have actually exceeded this target

by developing a capability to 850 feet. This new project, then, is really an extension of the work we have been doing but we are not setting a target depth. This will probably be determined by man's physiological limitations rather than by technology. It is important to find out what these limits might be.

Senator YOUNG. $6.3 million is requested for the project entitled "Deep ocean technology." How is the work on this project allocated between Navy in-house facilities and industrial organization?

Dr. FROSCH. We expect about $2 million will go directly to industry for contract renewal and new contracts. Of the balance of $4.3 million that goes to Navy laboratories, approximately 30 percent is utilized for contracts with industry. This means that on the order of 50 percent of the project's funds go to industrial organizations.

Chairman ELLENDER. Please describe your planned program for fiscal year 1973 and tell us how you will use the $6.3 million you are requesting.

Dr. FROSCH. Our program is oriented around three focal projects. Very generally, the first is the development of equipment, materials, and techniques necessary for an underwater construction capability; the second is extending the operational depth capability of the Navy-owned submersible *Alvin* to 12,000 feet; and third is development of an underwater work system which will permit us to perform mechanical tasks at great depths.

There is an almost infinite number of small tasks necessary to pursue these focal projects. Some major plans for fiscal year 1973 include beginning the design and construction of a logistics cache for use at a 3,000-foot water depth. It is also planned to complete fabrication of a 7-foot diameter titanium pressure sphere which will be installed in *Alvin*. The underwater work system focal project has sponsored development of a penetratorless method for transmitting signals through hulls. The equipment and methods will be tested in fiscal year 1973 as a means to transmit command and control data [deleted].

Senator YOUNG. Why do you need the increase of $747,000 you are requesting?

Dr. FROSCH. One of the items being developed is an acoustic imaging system to investigate the potential for increasing the range capability of existing underwater imaging systems. Our fiscal year 1973 budget includes $450,000 for an industrial contract to complete assembly of the prototype system. The balance of the increase is the result of any approximate 5-percent cost inflation.

MARINE BIOLOGICAL SYSTEM

Chairman ELLENDER. $1.8 million is requested for the program entitled "Special operations (advanced)—Advanced marine biological system" Has the committee been provided with full details on this program?

Dr. FROSCH. Yes, sir. The committee has been briefed on the detailed overall program plan.

ENVIRONMENTAL APPLICATIONS

Chairman ELLENDER. Of the total requested for other equipment, $1.3 million is for the program entitled "Advanced environmental ap-

plications." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

ENVIRONMENTAL APPLICATIONS (ADVANCED)

Description.—The Program Element consists of three separate but associated projects:

W3712—Atmospheric Applications. [Deleted.]

W3713—Automated Environmental Prediction System (AEPS). The development will satisfy environmental requirements of operating forces by providing accurate environmental predictions from the operational depths of the oceans to the upper limits of the atmosphere. System is essentially software and is divided into six subsystems: (1) system control and monitor, (2) report processing, (3) analysis, (4) prediction, (5) preparation and transmission, and (6) integrated data base.

W3714—Meteorological Measuring System (MMS). Development will provide a measuring system that includes the following components: (1) sensors to accurately measure meteorological variables; (2) the transducers and telemetry to convert measurements into messages suitable for high speed communications; (3) a display to present meaningful environmental information to command and control. The system is composed of three subsystems—shipboard, aircraft, and land (including unmanned platforms).

Work performed by.—W3712—Atmospheric Applications. Naval Weapons Center, China Lake, California; Naval Research Laboratory, Washington, District of Columbia.

W3713—Automated Environmental Prediction System (AEPS). Fleet Numerical Weather Central, Monterey, California; Environmental Prediction Research Facility, Monterey, California; Navy Weapons Engineering Support Activity, Detachment FAMOS.

W3714—Meteorological Measuring System (MMS). Naval Avionics Facility, Indianapolis, Indiana; Naval Air Development Center, Warminster, Pennsylvania; Office of Naval Research, Washington, District of Columbia; Naval Research Laboratory, Washington, District of Columbia; AVCO Everett Research Laboratory, Everett, Massachusetts.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1972 program.—W3712—Atmospheric Applications. [Deleted.]

W3713—Automated Environmental Prediction System (AEPS) and W3714—MMS. Not funded in Fiscal Year 1972.

Fiscal year 1973 planned program.—W3712—Atmospheric Applications. [Deleted.] Cloud physics instrumentation development, will be pursued by Naval Research Laboratory in developing an airborne total-water-content instrument and optical transmissometers using ultraviolet and white light sources.

W3713—Automated Environmental Prediction System (AEPS). Finalize development of hemispheric five-layer primitive equation model and improve initialization and heating terms. Automate and develop ocean structure climatology for support of the hydrodynamical model and Anti Submarine Warfare predictions. Initiate procedures to couple atmospheric and oceanic models. Partially develop techniques for incorporating selected numeric satellite data into analysis and prediction models.

W3714—Meteorological Measuring System (MMS). Complete selection and development of meteorological sensors for the shipboard MMS subsystem and begin fabrication of the overall sensing package. Develop appropriate signal processing and timing and control devices for interface with associated shipboard communications systems. Provide for manual as well as automated input of observations from shipboard and auxiliary (rawinsondes, rocketsondes) platforms. Develop environmental display devices based on output of the Automated Environmental Prediction System. Commence selection and/or development of sensors and processing equipment for airborne subsystem. Complete the advanced slant visibility measuring system and conduct test and evaluation. Complete cavity design of microwave refractometer.

Program to completion.—W3712—Atmospheric Applications. [Deleted.]

W3712—Automated Environmental Prediction System (AEPS). Continue to develop capability for input of satellite data into AEPS. Develop hemispheric

tropical upper air analysis model. Integrate multilayer ocean model with atmospheric primitive equation model to produce an interactive air-ocean model. Introduce spherical coordinates into primitive equation model in preparation for a global model. Increase vertical resolution of the model. Develop program to include moisture in the atmospheric primitive equation model. Test and implement automated transmissions. Continue development of integrated relationships between environmental severity and operations for which critical weather characteristics have been defined.

W3714—Meteorological Measuring System (MMS). Complete test and evaluation of shipboard and aircraft subsystems and proceed with engineering development if appropriate. Adapt elements of the shipboard subsystem in completing an MMS unit for land locations, adapting as much as possible equipment developed by other projects or agencies such as the improved rawinsonde being developed by the United States Air Force. For remote, unmanned land stations apply the technology of the National Data Buoy System and the Seaborne Environmental Reporting System. The system is modular in design and will be updated with available, advanced sensors before entering engineering development. Meteorological satellite readout equipment will be developed to maintain direct readout capability of National Oceanic and Atmospheric Administration advanced satellites.

Resources (In thousands of dollars:) R.D.T. & E.N. funds for fiscal year 1971, $1,891; fiscal year 1972, $1,235; fiscal year 1973, $1,280; additional funds to completion are continuing; and the total estimated cost is not available.

Environmental Applications

Chairman Ellender. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. Frosch. I will be glad to do so.

(The information follows:)

	Fiscal year—		
	1971	1972	1973
Atmospheric applications (W37–12)	1,198	1,235	780
Automated environmental prediction system (W37–13)	421	.....	200
Meteorological measuring system (W37–14)	272	.....	300

Chairman Ellender. Of the $1.3 million requested for advanced environmental applications, $780,000 is for the project entitled "Atmospheric applications." Has the committee been furnished with details on the project?

Dr. Frosch. No, sir; but we would be happy to provide a briefing at your convenience and will contact the committee staff to make arrangements.

Senator Young. Please describe briefly your planned program in environmental applications for fiscal year 1973.

Dr. Frosch. Environmental applications consist of three separate but related advanced development projects. The first, atmosphere applications, is a project directed primarily to the development [deleted].

The automated environmental prediction system will continue development of atmospheric and oceanic models to expand and improve operational forecasts to the fleet and operational control centers. Development of the five-layer hemispheric primitive equation model and the ocean thermal structure model are the primary fiscal year 1973 effort. The objective is to couple atmospheric and oceanic models in the remote ocean areas to provide timely, accurate, automated envi-

ronmental predictions in support of air, surface, and antisubmarine warfare operations.

The meteorological measuring system is a project to develop a capability for surface and airborne naval platforms to measure those parameters necessary for their own tactical function as well as provide an additional data input to the automated prediction system. The fiscal year 1973 effort includes development of a spectrometer for remote sensing of temperature and humidity from shipboard; and an atmospheric sounding system for the Navy's new weather reconnaissance aircraft, the WP3, and an advanced system compatible with the P3C and S3 ASW aircraft.

BIOLOGICAL AND CHEMICAL PROTECTION

Chairman ELLENDER. $512,000 is requested for the program entitled "Advanced biological and chemical protection". Can you give us a brief, unclassified description of this program?

Dr. FROSCH. Yes, sir. This program contains two separate projects. One involves the development of a biological/chemical automated shipboard detection system to enable the fleet to operate for extended periods of time without significant loss of mission effectiveness in a biological/chemical environment. Under development are two alternative alarms for nerve agent point detection and passive detection and one passive detection system for nerve agent advanced warning. This project also includes the development of two point sampling biological detectors. The other project includes the development of a Navy protective mask and suitable protective clothing for nuclear, biological, and chemical environments and will determine the feasibility of developing multipurpose protective clothing for use in other environments such as: emergency escape from fires, rocket fuel handling, sandblasting, etc.

Chairman ELLENDER. Just what are you planning to do with the $512,000 you are requesting for fiscal year 1973?

Dr. FROSCH. Under the shipboard detector project, $300,000 will be used to conclude background measurements and initiate agent/simulant testing at sea of the nerve agent advanced warning system, and to initiate logic determinations for an automatic point sampling biological detector. Under the shipboard personnel protection project, $212,000 will be used to initiate human factors studies; configure and build optimized mask components; begin optimization of the entire mask; complete protective clothing requirements; and conduct an initial survey of existing alternatives.

ENVIRONMENTAL PROTECTION

Chairman ELLENDER. $4.3 million is requested for the advanced development program entitled "Environmental protection". Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

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FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Advanced Development

Title: Environmental Protection (ADV)

Budget Activity: 7-Other Equipment

DESCRIPTION: There are three projects in this element:

S4659: Sewage treatment. This project develops a sanitary waste treatment system for large ships in near term, and waste treatment systems for small craft.

S4GX1: Shipboard Waste Management. This project develops a long term solution to the total waste problem aboard ships. An integrated waste management system to handle all types of ship wastes will be developed, as well as a compactor and encapsulator for noncombustible wastes, and a pollution-free shipboard incinerator which will burn garbage as well as paper and wood.

S4GX2 - Oil Pollution. Navy ships will be required to restrict overboard discharge of oil and oily water wastes to comply with Executive Order 11507 of 5 February 1970 and the Water Quality Improvement Act (PL 91-224). International agreement restricts ships from discharging oily water containing more than 100 parts per million (PPM) of oil in coastal waters. A proposal to completely halt all international discharge of oil and oily wastes into oceans by mid-decade has been made. Navy ships do not have the capability to meet either the 100 ppm or no discharge requirements at this time. Navy ships are required to ballast empty fuel oil tanks to maintain suitable draft, trim, and stability. When ballast is discharged overboard prior to refueling, it usually contains some fuel oil. Besides ballast, ships must discharge bilge water to prevent flooding of machinery spaces. Bilge water usually contains some oily matter. The objective is to develop practical oil/water separator systems for reducing oil pollution. Oil content monitoring instrumentation for ship effluent streams quality measurement will be adapted or developed. Accurate monitors are necessary to determine on-line performance of oil removal equipment. Effort will consider system of two general capacities: up to 100 gpm for processing bilge water and up to 2000 gpm for processing ballast water.

WORK PERFORMED BY: Naval Ships Engineering Center; Naval Ship Research and Development Center, Annapolis,; Naval Research Laboratory and Naval Facilities Command. Contract work by Fairbanks-Morse, Koehler-Dayton, Chrysler, General Dynamics, Tidol and Vorik Corporation.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

FY 1972 Program:

S4659 a. Construct the Koehler-Dayton basic (circulation, concentration, holding tank) sanitary treatment system. Evalution at Naval Ships Research and Development Center, Annapolis and commence Operational Evaluation (OPEVAL) aboard a destroyer.

For the following items b through e, the contracts call for three development phases which are: Phase I Demonstrate feasibility of concept; Phase II Design, manufacture and test a laboratory unit; and Phase III design, manufacture and OPEVAL of ship prototype.

b. Koehler-Dayton (Fluidized Bed add on) - continue Phase I and initiate Phase II.

c. Chrysler (recirculating oil flush) - complete Phase I, initiate and complete Phase II, initiate Phase III.

d. Thiokol (Ultraviolet eradication) - complete Phase I, initiate and complete Phase II, initiate Phase III.

e. General Dynamics (Membrane filtration) - complete Phase I and initiate Phase II.

f. Initiate development of treatment systems of shipboard wastes for small craft.

S46X1. S46X2. Not applicable; new start in FY-1973.

FY-1973 Planned Program:

S4657. a. Complete OPEVAL of the Koehler-Dayton Basic system.

b. Koehler-Dayton (Fluidized Bed) - complete Phase II and initiate Phase III.

c. Chrysler - complete final Phase development.

d. Thiokol - continue Phase III development.

e. General Dynamics - complete Phase II and initiate Phase III.

f. Continue development of shipboard waste treatment system for small craft.

S46X1. Investigate two candidate central waste processing methods, tentatively wet oxidation and a for of pyrolosis

S46X2. a. Commence development of 100 gpm oil-water separator.

b. Commence development of 2000 gpm oil-water separator.

c. Commence evaluation of oil content monitor.

d. Start ship testing of commercially available oil removal equipment.

e. Develop test system requirements for shore-based test facility.

Program to Completion:

S4657. Complete Thiokol and Koehler-Dayton secondary sanitary treatment sytems development in FY-74. Development of small craft waste treatment systems will be continued in FY-75.

S46X1. Continue experiments to select components for optimum waste handling systems aboard future naval vessels.

S46X2. Complete and test oil-water separators and monitoring equipment.

RESOURCES: ($ IN THOUSANDS)

	FY-71 & PRIOR	FY-1972	FY-1973	ADDITIONAL TO COMPLETION	TOTAL ESTIMATED COST
RDT&E,N FUNDS	400	1,906	4,250	Continuing	N/A

ENVIRONMENTAL PROTECTION

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each, for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. I will be happy to.

(The information follows:)

[In millions of dollars]

Project	Fiscal year—		
	1971 funding	1972 funding	1973 request
Sewage treatment	None	1.906	2.0
Shipboard waste management	None	None	2.0
Oil pollution	None	None	.25
Total			4.25

Chairman ELLENDER. It would appear that you are requesting funds for two new projects. The first one is entitled "Shipboard waste management," for which you are requesting $2 million. Please comment on the objectives of this program and tell us what you hope to accomplish in fiscal year 1973.

Dr. FROSCH. I will be pleased to. The objective of this project is to develop an integrated waste management system for shipboard use. The system will be designed to handle all types of wastes such as sewage, oily water, garbage, laundry wastes, and so forth, in a central processor. The goal is to eliminate all overboard discharge of polluting substances. In fiscal year 1973 we expect to award contracts for studies to develop optimized integrated waste management system models for several ship types. We also plan to award contracts for development of promising processes for treating all types of wastes. Two of these are the wet oxidation process and the pyrolysis process. Testing requirements will be developed.

Chairman ELLENDER. The other new project is entitled "Oil Pollution," and you are requesting $250,000. Please comment on the objectives of this program.

Dr. FROSCH. The objectives of the "Oil pollution" project is to develop an effective oil/water separator for shipboard use. This is essential in order to prevent the overboard discharge of oily water. The goal is to halt all intentional discharge of oil and oily wastes into oceans by middecade.

Senator YOUNG. Please comment on your need for the increase of $2.3 million you are requesting for "Environmental protection" for fiscal year 1973.

Dr. FROSCH. The $2.3 million increase is due to the new start projects "Oil pollution" and "Shipboard waste management." The oil pollution project is required to solve the near-term problem of oil discharges from our ships. The shipboard waste management project is required to solve the long-term problem of handling all shipboard wastes in an integrated manner.

SPECIAL WARFARE

Chairman ELLENDER. $7.2 million is requested for the advanced development program entitled "Special warfare (advanced)." Se-

lected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

SPECIAL WARFARE (ADVANCED)

Description.—Element contains following projects:

1. *S2705. Defense against U/W swimmer.*—Development of a system which will provide detection, localization and [deleted] kill or deterrent capability against a swimmer. The multi-sensor system includes radar, sonar, optics, and doppler sonar. Swimmers to be attacked with explosive weapons and electrical deterrent. [Deleted.]

2. *U3801. Swimmer weapons system.*—Provide Navy Combat Swimmers UDT/SEAL Teams) with weapons, ordnance, and related equipments to conduct [deleted] operations; anti-submarine and anti-shipping operations; offshore/inshore reconnaissance and clearance operations in support of amphibious, riverine and special warfare.

3. *S3802. Swimmer support system.*—Provide Navy Combat Swimmers (UDT/SEAL Teams) with delivery and recovery systems to conduct; [deleted]. Operations; anti-submarine and anti-shipping operations; offshore/inshore reconnaissance and clearance operations in support of amphibious, riverine and special warfare.

4. *S3820. Naval spec W/F craft.*—Develop a family of low risk prototype inshore Warfare craft that can be easily and rapidly service accepted for either U.S. Navy and/or [deleted] requirements. Missions include: Interdiction, Assault, Surveillance/Reconnaissance Patrol, Close Supporting Fire, Mining/Mine Countermeasures, Combat Swimmer Support, Covert Operations, and Training of Friendly Foreign Forces. Craft types include: Coastal Patrol Interdiction Craft (CPIC), Coastal Patrol Craft (CFC), Shallow Water Attack Medium (SWAM) and Shallow Water Attack Light (SWAL).

Work performed by.—Aerojet General Corporation, Azusa, Calif.; Oceanic Products Inc., San Diego, Calif.; Scott Aviation, Lancaster, N.Y.; General Electric Co., Philadelphia, Pa.; Naval Weapons Center, China Lake, Calif.; Naval Ship Research and Development Laboratory, Panama City, Fla.; Applied Research Laboratory of the University of Texas, Austin, Texas; Edo Western, Salt Lake City, Utah; Westinghouse, Baltimore, Md.; Bogue Electric Co., Paterson, N.J.; Naval Ordnance Laboratory, White Oak, Md.; Naval Ships Engineering Center, Washington, D.C.; Naval Ship Research and Development Center, Carderock, Md.; Stevens Institute of Technology, Hoboken, N.J.; Naval Ordnance System Command, Washington, D.C.; Naval Electronic Laboratory Center, San Diego, Calif.; Naval Ship Engineering Center, Norfolk Division, Norfolk, Va.; Atlantic Hydrofoil Corporation, Stonybrook, N.Y.; Naval Weapons Laboratory, Dahlgren, Va.; Naval Ordnance Station, Louisville, Ky.; Amron Corporation, Waukesha, Wisc.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1971 and prior accomplishments.—U3801.—Seventeen separate items have been developed and evaluated; fourteen have been service approved. Of the critically required items, the Swimmer Recall System has been completed; portions of the [deleted]. Sub-System have been designed and development commenced on others. [Deleted.]

Fiscal year 1972 Program.—S2705—Complete advanced development on radar, sonar, and optical subsystem, and initiate preparation of specifications for engineering development of subsystems. Initiate laboratory tests on breadboard central signal processor to simulated swimmer targets sensor inputs in real time for command/control decision of kill deterrence. [Deleted.]

U3801—Remaining three of foregoing 17 items will be service-approved. [Deleted.]

S3802—Acceptance Test of the six man SDV conducted in August 1971. It was considered unready for TECHEVAL and OPEVAL due to component unreliability. Program initiated for fault isolation, failure analysis, and component correction, necessitating a nine-month delay in Fleet introduction. Development of the two man SDV initiated; in-water tests of the first prototype will commence in January 1972. Training of Fleet personnel in operation/maintenance

of the SLSS commence in November 1971. TECHEVAL and OPEVAL of the SLSS will be conducted between January and June 1972.

S3820—Awarded contract for design/fabrication of CPIC 30mm Weapons System, including Gun, Mounts, Optics, Radar Fire Control; Award Contract for construction of CPIC; complete Mission/Threat Analysis for SWAL; initiate Design/Construction of SWAL; initiate Weapons Development for SWAL.

Fiscal year 1973 planned program.—S2705—Design and fabricate experimental signal processor. Gather performance data (ranges, azimuthal coverage, etc.) to verify or modify the design used in the processor. [Deleted.]

U3801.—The [deleted] Sub-System will complete evaluation and be service approved, except for the [deleted] which will enter TECHEVAL near end of the year. Work will commence on the Obstacle Clearance Subsystem.

U3802.—Conduct training for Fleet personnel in operation/maintenance of [deleted] SDV and conduct TECHEVAL and OPEVAL. Continue step-by-step development of the [deleted] SDV, including introduction of autopilot and doppler sonar navigator.

S3820.—Complete construction of CPIC and initiate T&E phase; complete T&E of 30mm weapons systems components; initiate design phase of CPC.

Program to completion.—*S2705.*—Procure service test models of radar, sonar and optical subsystems. Test systems in operational conditions. Complete advanced development with recommendations to proceed to Engineering Development.

U3801.—The [deleted] will be completed and service approved. The Obstacle Clearance Sub-System will be completed and service approved. Work will commence on an inert [deleted] (Training). Pending availability of funds, selected individual items will be completed on a priority basis including new weapon concepts.

S3802.—Complete TECHEVAL/OPEVAL of the [deleted] SDV and complete development of the two man SDV (including TECHEVAL and OPEVAL).

S3820.—Procure designs and construct all four craft. Test all subsystems and perform full scale trials of all craft; perform operations analyses of each prototype craft to validate selection and performance. Develop design packages for each craft for use by U.S. Navy, and [deleted].

Resources: (In millions of dollars:)

R.D.T. & E. funds for fiscal year 1971, $4,748; fiscal year 1972, $10,050; fiscal year 1973, $7,188; additional funds to completion are continuing; and the total estimated cost is not available.

Special Warfare

Chairman Ellender. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. Frosch. I will be glad to do so.

(The information follows:)

Project	Title	Fiscal year— 1971	1972	1973
S2705	Defense against underwater swimmer	$1,452,000	$3,879,000	$1,166,000
U3801	Swimmer weapons system	250,000	862,000	724,000
S3802	Swimmer support system	1,950,000	560,000	542,000
S3820	Naval special warfare craft	1,096,000	4,803,000	4,756,000
	Total	4,748,000	10,050,000	7,188,000

Chairman Ellender. Of the total requested for special warfare, $4.8 million is for a project entitled "Naval Special Warfare Craft". Please comment on this project and tell us what you hope to accomplish for 1973.

Dr. Frosch. This project was established in fiscal year 1971 to develop a family of low-risk prototype craft capable of performing the spectrum of missions required to support inshore warfare opera-

tions. The goals of the project are to develop a capability to design with confidence craft that can move easily and rapidly into engineering development and/or production. Missions include: interdiction, assault, surveillance/reconnaissance patrol, close supporting fire, mining/mine countermeasures, combat swimmer support, clandestine operations, and training of friendly foreign forces. The planned program for fiscal year 1973 includes completing construction and R.D.T. & E. of the coastal patrol and interdiction craft (CPIC), the first and largest prototype under development. Test and evaluation of the components for the 30mm. weapons systems will be completed, and two advanced designs for the experimental Coastal Patrol Craft (CPC) utilizing catamaran and monohull design concepts will be initiated. Finally, construction of four shallow water attack lights (SWAL) experimental test craft will be completed and test programs initiated.

Senator YOUNG. I note in the descriptive summary a reference to "four generic experimental craft types". Please comment on the development of these craft.

Dr. FROSCH. Three of these craft, the coastal patrol and interdiction craft (CPIC), the coastal patrol craft (CPC), and the shallow water attack light (SWAL), were the three I just discussed. The fourth craft, the shallow water attack medium (SWAM), will commence design in fiscal year 1975.

Chairman ELLENDER. Is it correct to assume that this project is being conducted at the same level as in fiscal year 1972?

Dr. FROSCH. Yes, sir.

RELIABILITY AND MAINTAINABILITY INITIATIVE

Chairman ELLENDER. $5 million is requested for the program entitled "Reliability and Maintainability Initiative." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Category: Advanced Development

Title: Reliability and Maintainability Initiation

Project: R417Z Reliability and Maintainability Initiative

Budget Activity: 7 - Other Equipment

DESCRIPTION: The life cycle costs of weapon and equipment systems can and are being examined for ways to minimize cost of operation. Maintenance appears to be a major cost factor in terms of O&M(N) dollars and critical skill manpower. A joint service effort was initiated by DEPSECDEF/DDR&E during August 1971. The Navy program will developnad validate applicable changes for selected systems, install and test changes in designated deployed systems, and upon completion of OT&E, incorporate the fixes into the weapons, training and support systems.

WORK PERFORMED BY: Contractors and Navy project offices responsible for each specific equipment, Navy laboratories and development activities.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

FY 1972 Program: The supplemental funding of $5.8 million will be used to initiate this program. The earlier this project commences, the greater will be our saving in operating and maintenance costs. We have selected the AN/AWG-10 missile control system for the F-4J aircraft and the 1200 psi steam propulsion plant as candidates for initial work under this program.

FY 1973 Planned Program: We will select from those now under consideration additional deployed weapons systems which require improvement in their reliability and/or maintainability so as to reduce downstream costs.

Program to Completion: This will be a continuous program with funding and selection of equipments and systems as is required.

RESOURCES: ($ in Thousands)

	FY 71 & Prior	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&E,N Funds	0	5800 *	5,000	Undetermined	N/A

*Included in FY 1972 Supplemental Request.

RELIABILITY AND MAINTAINABILITY INITIATIVE

Chairman ELLENDER. Can you give us some specific examples of ways in which this program has provided savings to the Government?

Dr. FROSCH. I will be happy to illustrate the manner in which this program potentially provides savings, although specific savings will be realized in the future by a reduction in the cost of ownership. Using the AWG–10 missile control system installed in the F4J aircraft as an example, the program goals are to increase the mean interval of flight hours between failure and to decrease mean downtime per failure. We hope to achieve these gains in reliability and maintainability by making improvements in those components which have a documented history of early failure. We expect the reduction in maintenance costs to additionally reflect a reduced manpower requirement for F4J squadrons. Significantly, readiness is increased by the availability of more ready-for-flight F4J weapon systems.

ANTISUBMARINE SENSORS PROTOTYPE

Chairman ELLENDER. $5 million is requested for the program entitled "Antisubmarine Sensors Prototype (Advanced)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

ASW SENSORS (PROTOTYPE) (ADVANCED)

Description.—In response to stated Navy needs contractors are submitting program proposals for prototyping effort. This prototyping is to examine technological opportunities for developing advanced capabilities in the Areas of V/STOL Aircraft for Sea Control Ship and ASW Sensors. This summary applies to prototyping of the ASW Sensors and concentrates on the building of hardware to demonstrate the advanced capabilities. Additionally two specific sensor prototyping efforts are to be initiated in FY 1973. The first, a [deleted] is expected to provide at least a [deleted] increase in figure of merit over the current DIFAR system. The second, a [deleted].

Work performed by.—All effort will be performed by contractors to be selected in early calendar 72.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—New program. Proposals are being received in NAVMAT in early January. Evaluation, selection and contracts are scheduled by mid February. Additional proposals will be accepted and reviewed.

Fiscal year 1973 planned program.—Complete FY 1972 contracts and initiate specific prototyping effort on [deleted] System. Sufficient data will be in hand in FY 72 to define the mechanical and erection mechanisms for the [Deleted]. The requested funds for prototyping will provide for two additional contractors to build advanced development models, in addition to the currently planned single contractor, allowing multiple approaches for the [Deleted] to be pursued. For the [Deleted] sufficient data will be in hand in FY 1972 to define the [Deleted] requirements. The requested funds for prototyping will provide for at least one contractor to build an advanced development model using proven concepts for the system.

Program to completion.—Subsequent effort would be required to complete the prototyping in FY 1974 and to complete necessary at sea testing prior to entering engineering development.

Resources (in thousands of dollars):

R.D.T. & E. funds for fiscal year 1971 and prior, $0; fiscal year 1972, $1,500; fiscal year 1973, $5,000; additional funds to completion are $0; and the total estimated cost is $6,500.

ANTISUBMARINE SENSORS PROTOTYPE

Chairman ELLENDER. I note in the descriptive summary that contractors for this work are to be selected in early 1972. Isn't the Navy going to perform any of this work in in-house facilities?

Dr. FROSCH. This has not been decided. In February 1972, the Navy reviewed seven prototype proposals submitted by industry, but rejected them because they did not seem to offer a high enough payoff. Instead we decided to limit the ASW prototype to the development of sensors for the surface effect ship (SES). In March, CHNAVMAT was directed to solicit from industry, proposals for a high speed, lightweight, variable depth sonar (VDS) prototype for use on hydrofoils and the SES. CHNAVMAT was directed to compare and evaluate the proposals received against an already developed NAVSHIPSYSCOM high speed towed sonar proposal (HSTS). It is anticipated that in May 1972, the Navy will select one or more HSTS prototypes from among the contractor proposals and the NAVSHIPSYSCOM proposal.

Senator YOUNG. Just exactly what do you intend to do with the funds you are requesting for fiscal year 1973?

Dr. FROSCH. We will commence development of a high-speed towed sonar (HSTS) prototype(s)) (in-house or contractor(s)) upon which to undertake production or engineering development of a high-speed VDS sonar for use on a hydrofoil platform and other high-speed vehicles with an early IOC and lowest possible costs. The specific goals of the fiscal year 1973 effort are:

(*a*) Develop a VDS capability for acquisition and attack/trail at high-own-ship speeds.

(*b*) Develop an effective long-range sonar detection/classification capability.

(*c*) VDS survivability at high speeds.

(*d*) Minimization of costs, risks, and unessential development.

(*e*) Simplicity, operability, reliability, and maintainability.

(*f*) Minimization of hardware redundancy where concurrency is not required or functions are integrated.

Chairman ELLENDER. Comment on the need for the large increase of $3.5 million you are requesting.

Dr. FROSCH. The $1.5 million requested in fiscal year 1972 was a modest amount required to start the ASW sensors (prototype) program. It was to be used primarily to solicit from industry and analyze various prototype candidates. The $5 million requested in fiscal year 1973 is to accelerate development of a high-speed towed sonar (HSTS) prototype, upon which to undertake production or engineering development of a high speed, lightweight, VDS sonar for use on a hydrofoil platform and other high-speed vehicles such as the surface effect ship (SES). The funds are required to complete the prototype development by [deleted] in order to allow the decision to undertake production or engineering development to be made in early [deleted]. Specially during fiscal year 1973 [deleted]. Funding estimates are as follows:

Trials components	[Deleted]
Trials	[Deleted]
[Deleted]	[Deleted]
System analysis and engineering	[Deleted]
In-house lab support	[Deleted]
Total	[Deleted]

ELECTROMAGNETIC AND OPTICAL SYSTEMS (ENGINEERING)

Chairman ELLENDER. $8 million is requested for the engineering development program entitled "Electromagnetic and optical systems (engineering)". Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

ELECTROMAGNETIC AND OPTICAL SYSTEMS

Description.—W1163—TRAM (Target Recognition Attack Multisensor) ensures commonality of A–6/A–7 aircraft TRAM system components to the maximum degree practicable. It supports field station test programs for A–6/A–7 TRAM and funds improvement efforts on TRAM hardware. (TRAM systems contain Infra-red imaging sensors, laser designators and laser spot trackers, see program elements 24114N/24115N).

W1165—The LTDS (Laser Target Designator System) project develops an aircraft mounted (A–4 aircraft) laser spot tracker and a hand held (by troops on the ground) laser designator with a follow-on effort at providing a stabilized laser designator for airborne forward air controllers. This system permits accurate delivery of air launched laser guided ordnance.

W1631—Visual Target Acquisition ID & WSC, develops an advanced version of the TVSU (Television Sight Unit), the HLGS (Hot Line Gun Sight) and the VTAS (Visual Target Acquisition System) for possible multiple aircraft applications.

S3641—Night Observation Devices (NOD). This project provides for development of devices to enhance the ability of naval surface forces to operate effectively under conditions of darkness without reliance on electromagnetic emissions.

C3675—Visible and Near Visible Frequency Intercept System (VANVIS). [Deleted.]

X3677—General Purpose Remote Sensor System (GPRSS). An integrated tactical intelligence collection, analysis, and dissemination system to provide intelligence information, which will be integrated with information from other available intelligence sources, to the operational commanders. [Deleted.] The system will be used in air strike operations, in amphibious operations, follow-on land combat operations and in those inshore and special warfare operations which require a system with an extensive capability.

X3817. Small Unit Remote Sensor System (SURSS). [Deleted.] Types of sensors include: seismic, magnetic, infrared, electromagnetic, acoustic and breakwire. The basic system is composed of sensors reporting to a single channel monitor receiver identifiable by unique identification code.

Work performed by.—Pacific Missile Range, Point Mugu, California; Naval Research Laboratory, Washington, D.C.; Naval Air Test Center, Patuxent River, Maryland; Naval Weapons Center, China Lake, California; Naval Air Development Center, Warminster, Pennsylvania; Naval Avionics Facility, Indianapolis, Ind.; Texas Instruments, Texas; Naval Underwater Systems Center, Connecticut; Autonetics, Ahaheim, California; Perranti LTD, Edinburgh, Scotland; TRW, Redondo Beach, California; NAVELECSYSCOMHQ. Washington, D. C.; Naval Ordnance Laboratory, White Oak, Maryland; RCA, Burlington, Massachusetts; Hazeltine, Hempstead, New York; Magnavox, Ft Fayne, Indiana.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

Fiscal year 1972 program.—W1163—Initiated planning of integrated logistics support, common support equipment, and field activity support of A–6 and A–7 TRAM programs.

W1165—Complete development of laser designator, supported improvements in the A–4 aircraft laser spot tracker.

W1631—The needs of various aircraft are being studied. Anticipate contracts for Helmet Mounted Sight, Hot Line Gunsight in early 1972. Most desirable method of optimizing SIDEWINDER Expanded Acquisition Mode within the aircraft systems is being determined.

S3641—Commence environmental test of LLLTV. OPEVAL of Submersible Small Night Telescope and Dua Magnification Small Night Telescope.

X3677—The interim general purpose sensor system will be completed and provided to Marine Corps and Navy Amphibious Forces for evaluation and sensor employment doctrine development. Technical development planning of the general purpose system, scheduded to be fleet operation in FY 76, will be completed in FY 72.

X3817—Initiate development on: electro-magnetic, infrared and breakwire detectors. Initiate test and evaluation on: Monitor receiver, transcoder, and magnetic, seismic and breakwire detectors.

Fiscal year 1973 program.—W1163—Continue planning, monitoring and field activity support of A–6 and A–7 TRAM programs to ensure effective commonality during development.

W1165—Complete improvements and design changes to the stabilized designator and the laser spot tracker.

W1631—Optimization and development work initiated with fiscal year 1972 funds will be completed. Initiate engineering development in laser detectors developed under other programs.

S3641—[Deleted.]

S3675—[Deleted.]

X3677—Operational systems development will proceed with minimum technical, cost and schedule risk toward a Service-approved system in FY 76. The presently planned development to be undertaken by the Navy will include: Target classification, Ground Element Sensors, Radio Components, Modulation & Coding. Relays, Readout Terminals and System Engineering.

X3817—Conduct TECHNEVAL/OPEVAL of SLAS and the entire integrated system.

Program to completion.—W1163.—Continued support and production commonality definition of A–6/A–7 TRAM programs. Development, test and evaluation of advanced electro-optical sensors.

W1165.—Support implementation of improvements and design changes. No RDT&E funds budgeted past FY 74.

W1631.—Evaluation of the performance of developed equipments and refining and assessing the interface with the present weapons systems is estimated to be completed in fiscal year 1977.

S3641–S3675.—[Deleted].

X3677.—Total system cost will depend on operational requirement refinements and associated technical decisions expected to be made in FY 72 and 73. Unit cost of ship and field terminals, data relays and sensors will be influenced by technical decisions and the impact of common item procurement.

X3817.—[Deleted.]

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, $3,918; fiscal year 1972, $7,944; fiscal year 1973, $8,053; additional funds to completion are continuing and the total estimated cost is not available.

ELECTROMAGNTIC AND OPTICAL SYSTEMS

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

[In thousands of dollars]

Project	Fiscal year 1971	Fiscal year 1972	Fiscal year 1973
TRAM technology	2,000	1,000	100
Laser target designator system	0	2,740	1,040
Visual target acquisition	0	2,515	1,010
Night observation devices	718	609	1,208
Visible and near visible frequency intercept system	0	0	1,500
Sensors for naval strike warfare	100	0	0
General purpose remote sensor system	100	0	2,150
Small unit remote sensor system	1,000	1,080	1,045

Chairman ELLENDER. Are you requesting funds for any projects which have not been previously funded? If so, please describe them.

Dr. FROSCH. There is one project having a fiscal year 1973 start [deleted].

Senator YOUNG. How is this program element related to the program entitled "Electromagnetic and optical systems (advanced)" which we discussed earlier?

Dr. FROSCH. We have attempted to list under one generic title those programs dealing with electro-optical devices. It's primarily an administrative convenience for those, such as yourself, who are interested in seeing this information as a group listing rather than searching for it through the entire budget. Naturally, some projects are further along than others in their developmental cycle and are therefore listed under the engineering development element. Others are in the incipient phase and are therefore listed under the advanced element, hence the reason for the two program elements.

Chairman ELLENDER. I note that one of the projects to be funded is concerned with the target recognition attack multisensor. How is this project related to the project on the A6E TRAM which we have already discussed?

Dr. FROSCH. Project TRAM is directed to engineering development of electromagnetic and optical systems components and concepts which have progressed from related advanced development projects. This project is now constrained to provide direct support of both the A–6 TRAM and A–7 TRAM development programs discussed earlier, at least through fiscal year 1973. The supporting functions provided here include coordination of the A–6 and A–7 TRAM development efforts to insure maximum feasible component commonality and prevent unnecessary duplication of effort in design, engineering, prototype development, testing, and documentation. We feel this approach, in providing a coordinating technical discipline between the two parallel aircraft systems programs, will prove to be most cost effective in development, production, and life-cycle support of these avionics systems.

Senator YOUNG. Why do you need the increase of $109,000 you are requesting for fiscal year 1973?

Dr. FROSCH. Primarily due to the start of the VANVIS project in fiscal year 1973, however, as you can see by the number of projects in this program element, there are other factors causing this increase.

TACTICAL COMMAND AND CONTROL

Chairman ELLENDER. Of the total requested for Other Equipment, $5.6 million is for the engineering development project entitled

"Tactical Command and Control (Engineering)". Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

TACTICAL COMMAND/CONTROL (ENGINEERING)

Description.—The capability to command and control forces of the future to oppose the expected threats of the future is of extreme importance. This Program Element contributes to the development of command and control capabilities by the development of sophisticated Identification Friend of Foe (IFF) equipment, by the pursuit of inter-service interoperability in tactical data systems, and in the future by the development of modern facilities for afloat tactical commanders.

IFF developments cover development of a rapid, positive identification system which will distinguish friend from foe and friend from friends, [deleted]. Installation of these airborne and shipboard identification systems, which will integrate with the Federal Aviation Agency (FAA) Systems, will require replacement of existing identification system components such as antennas, interrogators, transponders, decoders, and display devices.

The Joint Tactical Command Control and Communication Project (JTCCCP), commonly called TACS/TADS (for Tactical Air Control Systems/Tactical Air Defense Systems) will, through operational testing, demonstrate the interoperability of the Army's AN/TSQ–73 Tactical Air Defense System, the Navy's Naval Tactical Data System (NTDS) and Airborne Tactical Data System (ATDS) installed in fleet ships and aircraft, the Marines' Marine Tactical Data System (MTDS), and the Air Force AN/TSQ–91 system. In order to successfully demonstrate this interoperability it will be necessary to modify considerably the existing formats within which we presently exchange information on digital data links. The Navy is Executive Agent for the JCS in this effort.

Related activities.—NTDS, ATDS, MTDS, AN/TSQ–73, AN/TSQ–91, for TACS/TADS; the IFF efforts are tri-service in nature, with the Air Force acting as Executive Agent, and with the participation of the National Security Agency (NSA) and the FAA.

Work performed by.—Joint Interface Test Facility, San Diego; Logicon, Inc., San Diego; Fleet Computer Programming Center, Pacific, San Diego, California; Naval Research Laboratory, Washington, D.C.; Naval Electronics Laboratory Center, San Diego, California; Naval Air Navigation Electronics Project, Patuxent River, Maryland; Hazeltine Electronics, New York City; Whitaker Corporation, Los Angeles, California; SeaWell Laboratories, Springfield, Virginia.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

[Deleted.]

Fiscal year 1972 program.—For TACS/TADS, refine tests to be performed, describe and establish test bed hardware systems to include operational and test communications, and commence testing. For the IFF efforts, [deleted].

Fiscal year 1973 planned program.—For TACS/TADS, continue testing commenced in FY 1972. For the IFF efforts, [deleted].

Program to completion.—For TACS/TADS, complete testing to demonstrate compatibility and interoperationability, move the participating units of the four services and NSA to an operational environment, and demonstrates operational effectiveness of the total interface in a joint operational environment.

Resources (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, $4,306; fiscal year 1972, $4,675; fiscal year 1973, $5,561; additional to completion are Continuing; and the total estimated cost is not available.

TACTICAL COMMAND AND CONTROL

Chairman ELLENDER. Please provide for the record a tabulation listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. Yes, sir.

(The information follows:)

[In thousands of dollars]

	1971	1972	1973
IFF Mark XII	760	525	365
Shipborne IFF/Mark XII	650	652	368
IFF/ATCRBS	415	420	715
AIMS/ATCRBS/Mark XII	175	317	105
ASW group command and control	0	0	0
Naval advance tactical CCCP	2,306	2,761	4,008

Chairman ELLENDER. Of the total requested for tactical command and control, the largest part is for the project entitled "Navy Advanced Tactical Command Control Center Interface Program" for which you are requesting $4 million. Please describe the objective of this program.

Dr. FROSCH. The main objectives to demonstrate by testing the compatibility, interoperability, and operational effectiveness of joint operations of the naval tactical data system (NTDS); airborne tactical data system (ATDS); Marine air command and control system (MACCS); Army air defense command, control, and coordination systems (AN/TSQ–73); and Air Force tactical air control system, control and reporting center/post (AN/TSQ–91).

Senator YOUNG. Just exactly what do you plan to do with the $4 million you are requesting?

Dr. FROSCH. The one item being produced for this money is a 1974 version of the Navy's operational computer program. The remaining moneys will be devoted to purchase of communication equipment and to pay for test operations.

Chairman ELLENDER. Why do you need the increase of $1,247,000 you are requesting for fiscal year 1973?

Dr. FROSCH. They Navy advanced tactical CCCP program will be in full swing in fiscal year 1973. The increase in funds is needed in two areas. The first, to fund the completion of the NTDS computer programs required to prove the interoperability and compatibility of the Army, Navy, Marine Corps, and Air Force tactical air control and tactical aid defense systems. The second increase comes in the testing area. Fiscal year 1973 will be the first full year of testing the interacting systems.

INDEPENDENT NAVIGATION SYSTEM

Chairman ELLENDER. $304,000 is requested for the program entitled "Navigation (Engineering)—Independent Navigation System." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

NAVIGATION (ENGINEERING)

Description.—This project began as a joint development between U.S. and The Federal Republic of Germany (FRG) to design, build and test two miniature Inertial Navigation Systems (MINS). In exchange for design details and one MINS, the FRG shared the cost of development.

This project provides for the development of a small, lightweight, low cost inertial navigation system for surface ships (destroyers and larger) and submarines.

The system consists of an Inertial Measuring Unit (IMU) and a control console which displays continuous Latitude, Longitude and Altitude and accepts position resets from other navigation systems. The total weight is 400 lbs., requires 15 cubic feet, and requires about 1500 watts of power.

Two systems were built and tested in the laboratory and at sea. The design goal of position accuracy of [deleted] was exceeded in actual at-sea tests with accuracies of [deleted] demonstrated. One system has been delivered to FRG and the joint agreement is in process of being terminated.

Sperry Gyroscope has developed a Marine Aided Inertial Navigation System (MAINS) and this system will be investigated as a possible replacement for the obsolete MK 19 gyro compass.

Related activities.—All other DOD activities and NASA are aware of the program development through automatic exchange of reports and meetings.

Work performed by.—The first two systems were built by The AC Electronics Division of General Motors; laboratory and at-sea tests were conducted by Naval Strategic Systems Navigation Facility in Brooklyn, New York. MAINS work done by Sperry Gyroscope Division, with evaluation by Navy Strategic Systems Navigation Facility.

PROGRAM ACCOMPLISHED AND FUTURE PROGRAMS

Fiscal year 1972 program.—Terminate the U.S.-Federal Republic of Germany (FRG) joint development of MINS. Conduct a technical evaluation of a Sperry Marine Aided Inertial Navigation System (MAINS) as a possible replacement for the MK 19 gyro compass.

Fiscal year 1973 program.—Conduct Operational Evaluation of MAINS which will complete the project.

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, $508; fiscal year 1972, $342; fiscal year 1973, $304; additional to completion are $0; and the total estimated cost is not available.

INDEPENDENT NAVIGATION SYSTEM

Chairman ELLENDER. What do you intend to do with the funds you are requesting for fiscal year 1973?

Dr. FROSCH. The funds will be used to conduct an operational evaluation of a Sperry Gyroscope-developed marine-aided navigation system as a replacement for the obsolete MK 19 gyrocompass. The technical evaluation completed in fiscal year 1972.

Senator YOUNG. I note that this effort began as a joint project with the Federal Republic of Germany. Is there still a cooperative program being conducted between the United States and Germany?

Dr. FROSCH. No, sir. The cooperative development has been completed and is in the process of being mutually terminated.

Chairman ELLENDER. Please describe the difference between the MINS and the MAINS systems to which you refer in the descriptive summary.

Dr. FROSCH. The MINS system is a complex inertial navigator that will provide accurate position and velocity information [deleted] without reset. The MAINS system is a small, simple advanced gyrocompass built by Sperry Gyroscope with independent research funds and now being evaluated as a replacement for the obsolete MK 19 gyrocompass.

INTELLIGENCE

Chairman ELLENDER. $1.5 million is requested for the program entitled "Intelligence (Engineering)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

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FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

INTELLIGENCE (ENGINEERING)

Description.—Provide support to the U.S. Naval Investigative Service program of technical surveillance countermeasures support, counterintelligence operations and criminal investigations conducted for U.S. Navy. Provide executive agent effort for triservice program to develop equipment for the real-time transmission of reconnaissance data from airborne sensors to a surface processing terminal.

Work performed by.—Northrop Corporation, Palos Verdes, California; Scientific-Atlanta Incorporation, Atlanta, Georgia; Raytheon Company, Bedford, Massachusetts; Cubic Corporation, San Diego, California; CBS Laboratories, Stamford, Connecticut; Goodyear Aerospace Corporation, Phoenix, Arizona; Astro Communications Laboratory, Gaithersburg, Maryland; Westinghouse Corporation, Baltimore, Maryland; Hughes Aircraft Corporation, Los Angeles, California; Naval Electronics Laboratory Center, San Diego, California; Naval Research Laboratory, Washington, D.C.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS

Fiscal year 1972 program.—a. Continue R&D support of counterintelligence activities.

b. System testing of JIFDATS with selected sensors aboard RF–4C and OV–1D aircraft, following the modification of test aircraft.

Fiscal year 1973 planned program.—a. Continue R&D support of counterintelligence activities.

b. Complete flight testing of Joint Services In-Flight Data Transmission Systems (JIFDATS) system and complete Government evaluation.

Program to completion.—Continue R&D support of counterintelligence activities.

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for *fiscal year 1971*, $7,835; *fiscal year 1972*, $4,100; *fiscal year 1973*, $1,495; *additional to completion* are continuing and the *total estimated cost* is not available.

INTELLIGENCE

Chairman ELLENDER. I note that two projects are being funded under this program element for fiscal year 1973. Would you comment briefly on each of these projects and the need for the funds you are requesting?

Dr. FROSCH. I would be happy to do so. The joint services in-flight data transmission system project includes the final test and evaluation of aircraft and ground data processing equipment developed under this triservice development. This will complete the research, development, test and evaluation of this system under Navy management; procurement of operational systems is left to the option of the individual services. The counterintelligence equipment project supports the U.S. Naval Investigative Service program of technical surveillance countermeasures, operations, and criminal investigations conducted for the U.S. Navy.

Chairman ELLENDER. Which other services are involved in the funding of the joint services in-flight data transmission system?

Dr. FROSCH. This is a triservice program for which the Navy has been the executive agent and has funded the research, development, test and evaluation efforts. The Army and Air Force have, however, contributed funds, including: an initial $2 million contributed by each service upon program initiation in fiscal year 1968; contributions during the course of the development in support of service-peculiar needs; and prorated shares of a prime contractor cost growth in fiscal year 1972.

OTHER MARINE CORPS DEVELOPMENTS

Chairman ELLENDER. $8.1 million is for the program entitled "Other Marine Corps Developments (Engineering)." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Other Marine Corps Development (Engineering)

Category: Engineering Development

Budget Activity: 7-Other Equipment

DESCRIPTION: This Program Element provides RDT&E funds for the engineering development of all Marine Corps items except those in the areas of weaponry and vehicles, data systems and telecommunications. In FY 1973, the following four projects appear in this Program Element:

a. Lightweight Three-Dimensional Ground Control Intercept Radar (AN/TPS-59), 3110 - The primary mission of this radar will be to provide long range surveillance and ground control intercept capability to the Marine Landing Force in an amphibious environment. (See separate Project Descriptive Summary.)

b. Position Location Reporting Systems (PLRS), 3111 - PLRS will satisfy FMF requirements for an electronics system which will provide accurate, rapidly updated and comprehensive friendly position determination information on all elements of a landing force.

c. Tactical Warfare Analysis and Evaluation System (TWAES), 3112 - This project will develop an improved mobile computer - assisted tactical exercise control and evaluation system which will function in the Fleet Marine Force (FMF).

d. Hostile Weapons Locator - This project will provide equipment to meet a requirement to locate hostile weapons (artillery, mortars, rockets) with sufficient accuracy to permit their destruction by counterfire.

WORK PERFORMED BY:

a. Position Location Reporting System (PLRS) - McDonnell-Douglas Aircraft Company, St. Louis, Missouri.

b. Tactical Warfare Analysis and Evaluation System (TWAES) - Naval Electronic Laboratory Center, San Diego, California.

c. Hostile Weapons Locator - Lockheed Missiles and Space Company, Palo Alto, California; Technology Service Corporation, Santa Monica, California.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

FY 1972 Program:

a. Position Location Reporting System (PLRS) - The operational system concept was fully defined and the effort to Engineering Development. Phase I of a planned two-phase Engineering Development program is scheduled to commence in 4th Quarter FY 1972 with the award of a competitive contract for fabrication and evaluation of a PLRS engineering model.

b. Tactical Warfare Analysis and Evaluation System (TWAES) - TWAES System I will be operational by February 1972 and a systems configuration study will be completed. Work continues on the development and testing of simulation modules for artillery, mortar, naval gunfire and air support.

c. Hostile Weapons Locator - The program definition effort initiated in FY 1971 will continue through FY 1972.

FY 1973 Planned Program:

a. PLRS - Funding will be used to cover the fabrication and field evaluation costs for the PLRS Engineering Model. The FY 1973 effort will include engineering and documentation, hardware fabrication, software development, and field engineering support for extensive Marine Corps environmental and operational testing and miscellaneous related support efforts from government laboratories.

b. TWAES - TWAES System I will be operational in the first quarter and will be used in two operational exercises. The result of the exercises will be used to aid in the development of the follow-on system. TWAES System II will be constructed and will absorb the first generation during the third quarter.

c. Hostile Weapons Locator - The completion of program definition study will permit the start of design development and production of service test models.

Program to Completion:

a. PLRS - Engineering model fabrication and field evaluation will be completed during FY 1974 as will contract definition. Subsequently, fabrication and operational evaluation of a PLRS production prototype Service Test Model will progress through FY 1976.

b. TWAES - FY 1975 will be devoted to preparing TWAES System II for Fleet Marine Force (FMF) use.

c. Hostile Weapons Locator - Service testing of the Lightweight Hostile Weapon Locator will begin during first quarter FY 1974 and introduction into the FMF is scheduled for third quarter FY 1977.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	3,174	8,040	8,080	Continuing	NA

FUNDING OF PROJECTS

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

General BROOKS. I will be glad to do so.

(The information follows:)

OTHER MARINE CORPS DEVELOPMENTS (ENGINEERING)

[In thousands of dollars]

	Fiscal year 1971 actual	Fiscal year 1972 estimate	Fiscal year 1973 estimate
C3107—Marine direct air support system	7	400	
C3110—Lightweight 3-dimensional ground controlled intercept radar	3,167	4,900	4,000
C3111—Position location reporting system (PLRS)		2,000	2,450
C3112—Tactical warfare analysis and evaluation system		100	1,000
C3607—Lightweight hostile weapons locator		640	630
Total	3,174	8,040	8,080

Senator YOUNG. I note in the descriptive summary under the section listing related activities that both the Air Force and the Army have an interest in the position location reporting system. Is there any provision for a joint funding arrangement for the research into this system?

General BROOKS. Not at this time. However, the Army and Marine Corps are currently formalizing arrangements for a joint position location reporting system (PLRS) development program. It is envisioned that the LPRS service test model development will be jointly funded effort.

Chairman ELLENDER. Of the total requested for "Other Marine Corps Developments," $4 million is for the project entitled "Lightweight Three-Dimensional Ground Controlled Intercept Radar." I note that the Air Force and the Army were originally involved in this project and that they both withdrew. What special need for this radar does the Marine Corps have that these other services do not have?

General BROOKS. The Marine Corps has a unique requirement for a lightweight, air-transportable, long-range, ground controlled intercept radar to supoprt the Marine Air-Ground Task Force Commander in an amphibious environment.

Chairman ELLENDER. I note under "Related Activities" that the Army is interested in a transportable air surveillance radar but, and I quote, "its concept of employment requires significantly different characteristics." Please comment on this statement.

General BROOKS. The Army system is a radar for missile units, complementing U.S. Air Force surveillance systems. The Marine Corps system is a sensor for the operations center which performs long-range surveillance, ground control intercepts, and friendly air traffic control in addition to sending data and coordinating instructions to missile units. The Army requires less range, but greater elevation coverage.

Senator YOUNG. Comment on your planned program for fiscal year 1973 and tell us what you plan to do with the $4 million you have requested.

General Brooks. Phase II of the lighweight three-dimensional ground control intercept radar development program will be pursued in fiscal year 1973. Phase II includes the fabrication of a service test model as well as a complete technical and test data package. The project is heavily funded in order to allow the contractor to complete purchasing materials and to peak the engineering effort.

Marine Air/Ground Intelligence System

Chairman Ellender. $500,000 is requested for the program entitled "Marine Corps Data System—Marine Air/Ground Intelligence System." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Marine Corps Data Systems (Engineering)

Category: Engineering Development

Budget Activity: 7-Other Equipment

DESCRIPTION: This Program Element, newly established in FY 1973, provides RDT&E funds for engineering development related to Marine Corps data systems. Only one project appears herein in FY 1973, MAGIS. While our capability to gather information has been increasing rapidly in recent years, our capacity to process, evaluate, and analyze this data for the commander has not kept pace and is little advanced from World War II. The MAGIS program will provide a functional system, consisting of procedures and equipment, to process vast quantities of available information into timely and complete intelligence. Automated assistance is provided in those areas in which it would be most beneficial. The equipment will be modular in construction and will be housed in mobile, air transportable shelters. The subsystems within MAGIS are:

- Imagery Interpretation (II)
- Imagery Processing (IP)
- Intelligence Analysis/Storage and Retrieval (IA/SR)
- Tactical Electronic Reconnaissance Processing and Evaluation (TERPE)
- Signal Intelligence/Electronic Warfare Coordination Center (S/EWCC)

MAGIS systems will be employed at the Marine Amphibious Force, Division, and Aircraft Wing Headquarters with elements at the Marine Composite Reconnaissance Squadrons.

WORK PERFORMED BY: MAGIS is part of a joint Marine Corps/Air Force program established by the Department of Defense to develop equipment for the two Services. The Air Force development activity, Tactical Information Processing and Interpretation System Program Office (TIPI-SPO), is within the organization of Electronic Systems Division, Air Force Systems Command. TIPI-SPO is located at L.G. Hanscom Field, Bedford, Massachusetts.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

FY 1972 Program: A contract was awarded for the initial IA/SR Segment on 7 September 1971, and work will continue on this Segment and the II Segment. The S/EWCC definition effort and the system integration and checkout effort will continue. New tasks will be added to existing contracts to analyze the application of a Graphic Display to the S/EWCC functions and conduct a study on limited deployment and use of remote input/outputs (I/O's) in the IA/SR area. Funding was under 64765M, Other Marine Corps Development (Engineering).

FY 1973 Planned Program: S/EWCC definition system integration effort and IA/SR remote I/O study will continue. Service tests will be conducted on the II Segment and a Graphic Display will be defined for the TERPE function.

Program to Completion: In FY 1974 follow-on procurement is programmed to begin for the II Segment and initial procurement of the S/EWCC Segment is planned. Follow-on procurement of the IA/SR Segment and initial

procurement of the TERPE and Imagery Processing (IP) Segment is programmed for FY 1975. Testing and follow-on procurement of all MAGIS Segments will continue after that. Completion of procurement is expected during FY 1978.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	720	500	500	Continuing	NA

COMMENTS ON PROGRAM

Chairman ELLENDER. Please comment on this program and tell us what you hope to accomplish in fiscal year 1973.

General BROOKS. Yes, sir. While our capability to gather information has been increasing rapidly in recent years, our capacity to process, evaluate, and analyze this data for the commander has not kept pace and is little advanced from World War II. The Marine air/ground intelligence system (MAGIS) program will provide a functional system, consisting of procedures and equipment, to process vast quantities of available information into timely and complete intelligence. Automated assistance is provided in those areas in which it would be most beneficial. The equipment will be modular in construction and will be housed in mobile, air-transportable shelters. The subsystems within MAGIS are:

Imagery interpretation.

Imagery processing.

Intelligence analysis/storage and retrieval.

Tactical electronic reconnaissance processing and evaluation.

Signal Intelligence/Electronic Warfare Coordination Center

MAGIS systems will be employed at the Marine Amphibious Force, Division, and Aircraft Wing Headquarters with elements at the Marine Composite Reconnaissance Squadrons. In fiscal year 1973, the Signal Intelligence/Electronic Warfare Coordination Center definition system integration and the intelligence analysis/storage and retrieval remote input/output study will continue. Service tests will be conducted on the imagery interpretation segment and a graphic display will be defined for the tactical electronic reconnaissance processing and evaluation function.

Chairman ELLENDER. According to the descriptive summary, this is a new program element. Where was this project funded in prior fiscal years?

General BROOKS. Prior year accounting for this project was done under program element 64704M, Other Marine Corps systems.

HUMAN RESOURCES

Chairman ELLENDER. $1 million is requested for the program entitled, "Human resources (engineering)". Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

HUMAN RESOURCES (ENGINEERING)

ENGINEERING DEVELOPMENT

Description.—This Element contains three active projects, Communication and Navigation Training System, Mine Warfare Trainer, and Prototype Fire Fighting Trainer. These are large, general purpose system trainers which will provide greatly improved training capabilities in critical areas. The Communication and Navigation Trainer will be used primarily in the training of Navy Flight Officers (NFO's).

Work performed by.—Naval Training Device Center, Naval Weapons Laboratory, General Electric Company.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 programs.—Factory assembly of the COM/NAV Trainer is expected to be completed in May 1972. A contract will be awarded for the Prototype Radar Land Mass Simulator for this trainer. The Technical Development Plan (TDP) will be issued and initial development work will commence on the Mine Warfare Trainer. Installation and Evaluation of the Fire Fighting Trainer will continue.

Fiscal year 1973 planned program.—Complete installation and testing of the COM/NAV at Pensacola, its operational site, will be completed in September, 1972. Development will proceed on the Mine Warfare Trainer. The Fire Fighting Trainer will be completely installed, and testing will continue.

Resources (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, $900; fiscal year 1972, $410; fiscal year 1973, $1,015; additional funds to completion are continuing; and the total estimated cost is not available.

HUMAN RESOURCES

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. Yes, sir.

(The information follows:)

64770N—HUMAN RESOURCES (ENGINEERING)

	1971	1972	1973
W-43-14—Communications and navigation trainer	420	410	515
X-43-15—Mine warfare trainer	260	0	500
Y-43-16—Fire fighting trainer	220	0	0
Total	900	410	1,015

Chairman ELLENDER. Please comment on the objectives of this program and tell us why you need the very large increase of $605,000 you are requesting.

Dr. FROSCH. Yes, sir. The objectives are set forth in the descriptive summary. The requested increase of $605,000 represents only a fraction of the amount required to support training devise prototype developments to meet the priority needs established by the Chief of Naval Training.

AIRBORNE PYROTECHNIC SEEDING DEVICES

Chairman ELLENDER. $1.1 million is for the program entitled "Airborne pyrotechnic seeding devices." Has the committee been provided with complete details on this program?

Dr. FROSCH. Yes, sir. However, I would be pleased to outline the program at this time.

[Deleted.]

BIOLOGICAL AND CHEMICAL PROTECTION

Chairman ELLENDER. $802,000 is for the project entitled "Biological and chemical protection." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

BIOOGICAL CHEMICAL PROTECTION (ENGINEERING)

ENGINEERING DEVELOPMENT

Description.—Element contains following projects:

1. *S4801. BR/CW ship protection systems.*—To enable naval ships to operate for extended periods of time in environments contaminated with biological and/or toxic chemical warfare agents. This project funded the installation, test and evaluation of a "breadboard" STOPS (Shipboard Toxicological Operational Protective System) aboard U.S.S. *Herbert J. Thomas* (DD 833). Need now exists to optimize STOPS in terms of performance, cost, space and weight; develop improved equipment for increased performance and cost reductions; and support Ship Concept formulation trade-off studies with a data bank of information on alternative STOP systems.

2. *S3813. CW shipboard detector XMB.*—Existing and potential chemical warfare (CW) agents are lethal in extremely small dosages and provide little or no perceptible sensory warning of their presence. Sensitive and reliable devices are required to detect lethal chemical warfare nerve agents aboard ship and provide sufficient warning to allow protective measures to be taken. [Deleted.] Consideration will be given to: (1) Radio frequency interference; (2) Marine environment; and (3) interferences from ship operations.

Work performed by.—Naval Research Laboratory (NRL), Washington, D.C.; Naval Weapons Laboratory (NWL), Dahlgren, Va.; Naval Ship Engineering Center (NAVSEC), Hyattsville, Md.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1971 and prior accomplishments.—S4801. U.S.S. *Herbert J. Thomas* (DD 833) demonstrated STOPS to be technically and operationally feasible. S4813. Initial ship tests have been completed on ship classes DLG, LKA, LPD, LPH and CVA with satisfactory results. A MIPR was issued to Edgewood Arsenal for the purchase of production model detector modules. Two power supply units were designed and tested satisfactorily. Radio Frequency Interference testing was completed and indicated the need for protective shielding or below deck mounting. Remote readout modules compatible with the shipboard environment were designed.

Fiscal year 1972 program.—S4801. Initiate development of a cost/weight effective air filter unit. Formulate requirements for optimization of decontamination station/air lock designs. S4813. [Deleted.] Shipboard tests with full detection equipment will be initiated.

Fiscal year 1973 planned program.—S4801. Filter unit, development program will be continued. Decontamination station hardware will be procured and tested. Analyze the air conditioning and ventilation parameters affecting STOPS and develop appropriate design guides/requirements as related to conventional steam powered, gas turbine powered and diesel powered ships. Develop design criteria for optimizing STOPS. Develop cost effective designs/techniques for closure of special spaces, such as bridge, gun mounts, director spaces, etc. S4813. All environmental, laboratory and shipboard tests will be completed. A contract will be issued for development of appropriate manuals. [Deleted.] The proposed programs for FY–73 will make available such a capability in the fleet by the end of FY–74.

Program to completion.—S4801. Expect that decontamination station design work will be completed at end of FY–74. All other work described above will be completed by end of FY–77. S4813. An OPEVAL will be conducted on the full detection system. Necessary specifications and manuals will be developed.

Resources (In thousands of dollars):

R.D.T. & E. funds for fiscal year 1971 and prior, $400; fiscal year 1972, $391; fiscal year 1973, $802; additional funds to completion are continuing; and the total estimated cost is not available.

Chairman ELLENDER. Please describe your planned program for fiscal year 1973.

Dr. FROSCH. I will be glad to do so. With regard to the biological/chemical shipboard protection systems, we plan to continue develop-

ment on the filter unit program; procure and test decontamination station hardware; analyze the air conditioning and ventilation parameters affecting the "breadboard" shipboard toxicological operational protective system (STOPS) aboard U.S.S. *Thomas* and develop appropriate design guides/requirements as related to conventional steam powered, gas turbide powered, and diesel powered ships; develop design criteria for optimizing STOPS; and develop cost effective designs/techniques for closure of special spaces, such as the bridge, gun mounts, director spaces, etc. [Deleted.]

Senator YOUNG. Why do you need the rather large increase of over $400,000 you are requesting?

Dr. FROSCH. In fiscal year 1972, the majority of development in shipboard protection systems was devoted to design analysis studies. In fiscal year 1973, a considerable effort will be directed toward the construction of mockups for evaluation of critical system components such as air locks, decontamination facilities, et cetera. The cost of procurement for these components and their associated testing account for approximately 90 percent of the increase in dollars. The remaining 10 percent will be dedicated to the procurement [deleted] and the issuing of a contract for development of appropriate technical and operational manuals.

PROGRAM MANAGEMENT AND SUPPORT

Chairman ELLENDER. The next budget activity to be considered is programwide management and support for which you are requesting $159.1 million. How much was provided for this budget activity in fiscal years 1971 and 1972?

Dr. FROSCH. A total of $143.1 million was provided for this budget activity in fiscal year 1971, and the fiscal year 1972 estimate is $152.9 million.

Chairman ELLENDER. Describe generally the kinds of activities funded under this budget activity.

Dr. FROSCH. This budget activity includes R.D.T. & E.N. effort not separately provided for under other budget activities and not distributed directly to program elements/budget subactivities having specific program objectives. It includes the following:

(*a*) A continuing program of facilities and installation support to provide for Navy inhouse R.D.T. & EN. costs not identified to specific projects under other budget activities. This support includes operation, management, maintenance, and minor construction and alteration costs of R.D.T. & E. facilities that are not industrially funded and those operation and maintenance costs at industrially funded activities that are not chargeable as overhead items; instrumentation and general purpose equipment; the Office of Naval Research Headquarters and the Navy-wide patents program; the Navy-wide long term training program; and maintenance, operation, and overhaul of aircraft and ships engaged in R.D.T. & E. work.

(*b*) Primary support of certain R.D.T. & EN. facilities such as the Atlantic Undersea Test and Evaluation Center; the Naval Arctic Research Laboratory, which was funded by the Air Force prior to fiscal year 1973; the Supreme Allied Command Atlantic ASW Re-

search Center at La Spezia, Italy; and special laboratory support for Marine Corps research and development effort at Quantico, Va.

(*c*) Management and technical support in the areas of ASW tactical and operational analysis, an ASW support system, ASW intelligence, future sea-based strategic systems, electromagnetic systems, and the Navy research and development information system (NARDIS).

(*d*) Support of the Anti-ship missile defense (ASMD) program, including the ASMD test range and the U.S.S. *Hip Pocket*.

FACILITIES AND INSTALLATION SUPPORT

Chairman ELLENDER. $112.6 million is requested for the management and support of installations and facilities. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E.N. DESCRIPTIVE SUMMARY

FACILITIES AND INSTALLATION SUPPORT

MANAGEMENT AND SUPPORT

Description.—Facilities and Installation Support is a continuing program which provides for Navy in-house RDT&E costs not identified to specific projects under other budget activties. Support provided includes operation, management, maintenance, and minor construction and alteration costs of RDT&E facilities that are not industrially funded and those operations and maintenance costs at industrially funded actvities that are not chargeable as overhead items; instrumentation and general purpose equipment including technical collateral equipment for ranges other than Pacific Missile Range and Atlantic Undersea Test and Evaluation Center; the Office of Naval Research Headquarters and the Navy-wide Patents Program; Navy-wide Civilian Long Range Training Program; Operational Test and Evaluation Force; and maintenance, operation and overhaul of aircraft and ships engaged in RDT&E work.

Work performed by.—RDT&E, N activities.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1972 program.—Provide support as outlined in "Description" above.

Fiscal year 1973 planned program.—Continue to provide support as outlined in "Description" above. The decrease in requested funds in FY 1973 compared to FY 1972 is primarily due to transfer of the Naval Training Devices Center funding from RDT&E to O&MN.

Resources (In thousands of dollars:)

R.D.T. & E.N. funds for fiscal year 1971, $109,608; fiscal year 1972, $122,036; fiscal year 1973, $112,592; additional funds to completion are continuing; and the total estimated cost is not available.

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the estimate for fiscal year 1973.

Dr. FROSCH. I will be happy to.

(The information follows:)

PROGRAMWIDE MANAGEMENT AND SUPPORT (ELEMENT CODE 65851)

[In thousands of dollars]

Project number	Title	Fiscal year— 1971	1972	1973 estimate
	MANAGEMENT AND SUPPORT—FACILITIES AND INSTALLATION SUPPORT			
RF 099-01	Operations and management support	5,887	7,024	6,958
UF 099-01	Operations and management support	1,793	2,687	2,360
MF 099-01	Operations and management support	2,609	2,500	2,676
WF 099-01	Operations and management support	23,064	27,830	26,240
PF 099-01	Operations and management support		50	277
SF 099-01	Operations and management support	188	240	240
ZF 099-01	Operations and management support	8,138	5,539	6,119
XF 099-01	Naval training device center operations and management support	7,214	7,623	
RF 099-02	Instrumentation and equipment	901	1,206	1,306
UF 099-02	Instrumentation and equipment	218	361	400
MF 099-02	Instrumentation and equipment	460	460	500
ZF 099-02	Instrumentation and equipment	9,089	11,890	11,025
RF 099-03	Independent research and development evaluation		50	50
YF 099-05	Facilities operation and maintenance	1,042	1,068	968
YF 099-06	Collateral equipment for military construction projects	507	565	665
SF 099-07	Operational test and evaluation force support	780	887	950
WF 099-09	Research, development, test and evaluation flight hours	8,557	9,600	9,700
RF 099-20	Navy-wide long range training	1,672	1,842	1,907
WF 099-72	Aircraft support	18,798	20,905	20,910
SF 099-73	Ships support	8,307	9,238	8,708
RF 099-75	Research and development technical support	9,975	10,471	10,633
HF 099-76	Oceanographic instrumentation and equipment	409		
	Total	109,608	122,036	112,592

Chairman ELLENDER. I note in the project listing a number of projects entitled "Operations and management support." Generally speaking, what are the funds provided for these projects used for?

Dr. FROSCH. In general the operations and management support funds provide for recurring operational, management, maintenance and facility support for inhouse effort not identified to specific projects under other budget activities. This support includes:

(1) Structural alterations, additions and equipment rearrangements at naval industrial funded activities which, under NIF regulations, may not be charged to the naval industrial fund but must be budgeted separately.

(2) Minor construction and alteration projects not exceeding $50,000.

(3) General purpose nontechnical equipment, such as office equipment.

(4) Military support costs.

(5) Certain service costs, such as supply, comptroller, administrative, public works, and similar functions.

(6) Photographic collateral equipment for Navy R.D.T. & E. activities.

(7) Other costs not identified specifically with any operational category, such as official mail and transportation costs.

(8) Maintenance and repair costs for buildings and roads.

Senator YOUNG. Please comment on the operations and management support Project No. RF099–01 for which you are requesting $7 million, and tell us what you will do with the funds you are requesting.

Dr. FROSCH. Project RF099–01 supports operation and management costs of ONR research and development programs, and provides for (*a*) structural alterations, additions and equipment rearrangements at

the Naval Research Laboratory which, under the Navy Industrial Fund regulations, may not be charged to the Navy Industrial Fund but must be budgeted separately; (*b*) operation and management of the Office of Naval Research Branch Offices. The continental branch offices are responsible for performing fund administration for the Navy, Army, Air Force, and the National Aeronautics and Space Administration contracts with universities, colleges, and certain other nonprofit institutions located within their respective geographical areas of responsibility; and (*c*) certain other costs not identified specifically with any operational category, such as official mail, transportation of research equipment, and expenses connected with the Naval Research Advisory Committee.

Chairman ELLENDER. What is the purpose of the branch office of the Naval Research Laboratory located in London, England, and how much of the funds requested are for its support?

Dr. FROSCH. The mission of the ONR branch office in London, England, is to survey worldwide findings, trends, potentialities, and achievements in research and development by establishing and maintaining liaison with scientific research agencies and those development agencies conducting programs of interest to the U.S. Navy. This liaison exists in the United Kingdom, Europe, and such other geographical areas as designated by the Chief of Naval Research. The London branch office represents the Assistant Secretary of the Navy (Research and Development), the Chief of Naval Operations and the Chief of Naval Research in European scientific and technical matters of interest to the U.S. Navy, and assists Navy commands in both contracting and patent matters in the United Kingdom, Europe, and adjacent geographical areas. General technical assistance is also provided to other U.S. Government scientific and technical agencies.

Funding of the ONR London branch office is included in Project RF 099–01, Operations and Management Support, as follows:

Fiscal year 1971, $540,000; fiscal year 1972, $604,000; and fiscal year 1973 request, $632,000.

Chairman ELLENDER. Comment on the operations and management support Project No. WF 099–01 for which you are requesting $26.2 million.

Dr. FROSCH. This project includes funding for minor construction range instrumentation, first destination transportation, collateral equipment, research and support equipment, aircraft ferrying, support for all Navy photographic collateral equipment, and military support costs at NIF (Naval Industrial Fund) activities. Military support costs are nonmission related support provided to tenants such as: routine maintenance; administration, supply and fiscal services; security and fire protection; and industrial relations service. Approximately two-thirds of these funds go for military support costs of the nine Naval Air Systems Command R.D.T. & E. activities.

Senator YOUNG. Please comment on the operations and management support Project No. ZF 099–01 for which you are requesting $6.1 million.

Dr. FROSCH. This project provides operational and facility support to R. & D. direct project and tenant effort at research laboratories of the Chief of Naval Material (CNM). Support provided includes:

(1) Minor construction projects not exceeding $50,000.

(2) Rearrangement of laboratory areas within existing facilities to meet changing needs of R. & D., including equipment installation.

(3) General purpose nontechnical equipment, such as office equipment.

(4) Certain service costs incurred at R.D.T. & E. field activities and billed to CNM such as penalty mail, leased communication lines, and transportation charges.

(5) Limited funding of nonmission support costs such as logistic support for tenant activities.

(6) Alteration projects (up to $50,000) and repair projects for military support facilities.

Chairman ELLENDER. What do the different letters in front of the project numbers for operations and management support signify?

Dr. FROSCH. The initial prefix letters for the various projects entitled "Operations and Management Support" identify the Navy Bureau or Command administering the R. & D. programs funded by these projects, as follows:

RF 099–01 Office of Naval Research.
UF 099–01 Naval Ordnance Systems Command.
MF 099–01 Bureau of Medicine and Surgery.
WF 099–01 Naval Air Systems Command.
PF 099–01 Bureau of Naval Personnel.
SF 099–01 Naval Ship Systems Command.
ZF 099–01 Director of Laboratory Programs.
XF 099–01 Naval Electronics Systems Command.

Chairman ELLENDER. Four projects are entitled Instrumentation and equipment. Tell us generally what is involved in these projects.

Dr. FROSCH. These projects provide for procurement of general purpose research equipment, items of range instrumentation, support equipment such as machine tools, technical collateral equipment associated with military construction projects for all the various R.D.T. & E. laboratories and other R.D.T. & E. activities. General purpose research equipment includes voltmeters, oscilloscopes, ultrasonic cleaners, amplifiers, microscopes, and so forth. The R.D.T. & E. activities, inventory of such equipment is in the $250 million range and wear and tear from usage necessitates replacement of many items each year. New and more sophisticated equipment is needed to provide greater accuracy of measurement demanded by present technology.

Senator YOUNG. $11 million is for the instrumentation and equipment project number ZZF 099–02. Why do you need such a large sum of money for this project?

Dr. FROSCH. This project provides for procurement of general purpose research equipment, items of range instrumentation, support equipment such as machine tools, technical collateral equipment associated with military construction projects for R.D.T. & E. laboratories under the Chief of Naval Material (CNM). The CNM laboratories' inventory of such equipment is in the $100 million range. New and improved range instrumentation items are continually required to measure and record test data of various weapons and their components in the media—or simulation of the media—in which they might be expected to function. Following range categories are typical of those supported by range instrumentation funding: Guided missile range, ballistic range, underwater range, aircraft range, captive flight range,

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propulsion test facilities, and wind tunnels. Range instrumentation includes such items as cinetheodolites, recorders, high speed cameras, tracking mounts, telementry equipment, and so forth. Current range instrumentation inventory at the CNM laboratories approximates $100 million. Project also provides for acquisition of machine tools to support laboratory requirements. Present annual rate of funding approximates 2 percent of plant value, while 5 percent is considered reasonable by DOD guidance and commercial practice. This is the only source of funds that the CNM laboratories have to procure new or replacement general purpose research equipment and instrumentation items necessary to carry out assigned technical programs.

Chairman ELLENDER. $9.7 million is for the project entitled "Research, development, test and evaluation flight hours." Precisely what support to the R.D.T. & E. flying program do these funds provide?

Dr. FROSCH. This project supports the operation of Navy R.D.T. & E. and station administrative aircraft. The project provides petroleum, oil and lubricants, stock funded material, and intermediate level maintenance material support for R.D.T. & E. station aircraft in support of the Navy's R.D.T. & E. effort. Support to each activity is based on flight hour requirements generated by projects. Adequate support is essential to accomplishment of R. & D. project objectives.

Senator YOUNG. Of the total requested for facilities and installation support, $20.9 million is for the project entitled "Aircraft support." Comment on this project and tell us what the funds for fiscal year 1973 will be used for.

Dr. FROSCH. This project provides the depot maintenance support of Navy R.D.T. & E. and station administrative aircraft. This support includes the rework and repair of R.D.T. & E./station aircraft, overhaul of engines and reparable parts for all R.D.T. & E./station aircraft and rework and conversion of aircraft designated for the aerial target program. These aircraft and aerial targets provide essential direct and indirect support for all R.D.T. & E. projects requiring flight test and evaluation.

Senator YOUNG. For ships support, $8.7 million is requested. Comment on the objectives of this project.

Dr. FROSCH. This project funds the costs of overhauls, supplies, and equipage repairs, restricted availabilities/technical availabilities, fuel, and so forth, for surface ships, submarines, and hydrofoil craft operating as research platforms in support of R.D.T. & E. programs.

Senator YOUNG. How many ships does the Navy have in its R. & D. program which are supported by this project?

Dr. FROSCH. There are presently nine ships supported by this project.

Chairman ELLENDER. $10.6 million is requested for research and development technical support. Describe generally what these funds are used for.

Dr. FROSCH. This project supports the functions of the Office of Naval Research Headquarters, which include: (*a*) the coordination of research for the Navy; (*b*) the scientific and technical administration of the research and exploratory development programs conducted by the Office of Naval Research, primarily with colleges and universities and the Naval Research Laboratory; (*c*) the financial man-

agement of the Navywide R.D.T. & E.N. appropriation for the Assistant Secretary of the Navy (Research and Development); (*d*) the contract negotiation of the research programs of the Navy and related programs funded by the Advanced Research Projects Agency (ARPA) with colleges and universities; and (*e*) the administration of the Navywide patent program. This project also suport Navywide field services for the administration and control of effort within, or on behalf of, the Department of the Navy relating to patents, inventions, trademarks, copyrights and royalty payments, and coordinates such activities with the research, development, and procurement activities of the Navy.

Chairman ELLENDER. What sort of technical support is provided for programs conducted by colleges and universities?

Dr. FROSCH. No funds are provided to colleges and universities from this project. However, scientists in the Office of Naval Research Headquarters—acting in their capacity as scientific officers for contracts with colleges, universities, and nonprofit institutions—guide and monitor the scientific and technological programs for which they are responsible. These scientific officers are in frequent contact with the principal investigators and make technical inputs as required.

Senator YOUNG. Why do you need the increase of $162,000 you are requesting?

Dr. FROSCH. The requested increase of $162,000 essentially reflects the net result of the full-year impact in fiscal year 1973 of the January 1972 civilian salary increase, partially offset by 2 less paid days in fiscal year 1973.

ATLANTIC UNDERSEA TEST AND EVALUATION CENTER

Chairman ELLENDER. Of the total requested for Programwide Management and Support, $12.1 million is for the support of the Atlantic Undersea Test and Evaluation Center, also known as AUTEC. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

MANAGEMENT AND SUPPORT

ATLANTIC UNDERSEA TEST AND EVALUATION CENTER

Description.—AUTEC is complex consisting of three test measurement ranges of unique and advance design which have been and are being developed to meet R. & D. and operational, test, and evaluation requirements of Navy. Includes [deleted] AUTEC ranges located in Tongue of the Ocean, with land-based instrumentation, data processing, communication and support facilities on Andros Islands, Bahamas. AUTEC facilities provide [deleted]. Operation and continued development of AUTEC range facilities required to meet R. & D. and operational test, evaluation requirements.

Work performed by.—Present prime contractor for maintenance and operation is RCA Service Company, Camden, N.J. Original installations by Nat Harrison Associates, Miami, Fla.; Lockheed Electronics Co., Plainfield, N.J.; ITT Federal Laboratories, Nutley, N.J.; Decca Navigator Co., Ltd., New Malden, Surrey, England. Control Data Corp., Minneapolis, Minn., provided computer systems under lease and purchase agreements. General Dynamics Corp., Rochester, N.Y., completed sonar study. Naval Underwater Systems Center, Naval Ship Research and Development Center, Naval Research Laboratory, Naval Oceanographic Office, and Naval Electronics Laboratory Center provided in-house support.

Fiscal year 1972 program.—Complete design and prepare specifications and requirements for [deleted] range. Manufacture and assemble improved [deleted] measurement in-water array (equipment). Define [deleted] range requirements. Continue contractor maintenance and operation under technical, operational, and managerial direction and support of Government. Complete competitive procurement of new maintenance and operation contract. Complete purchase conversion of AUTEC computer system. Continue to provide range and data support for R&D and Operational Test and Evaluation.

Fiscal year 1973 planned program.—[Deleted.] Continue contractor range operation and maintenance under technical and managerial direction and support of Government. Continue to provide range and data support for R&D and Operational Test, and Evaluation.

Resources (In thousands of dollars) :

R.D.T. & E.N. funds for fiscal year 1971, $14,497; fiscal year 1972, $12,911; fiscal year 1973, $12,056; additional funds to completion are continuing; and the total estimated cost is not available.

THE ATLANTIC UNDERSEA TEST AND EVALUATION CENTER

Chairman ELLENDER. What ranges make up the AUTEC complex, and where are they located?

Dr. FROSCH. AUTEC consists of three underwater ranges located in the Tongue-of-the Ocean, Bahamas. The main base is located on Andros Island, Bahamas. The ranges include the weapons range, acoustic range, and sonar range.

Senator YOUNG. What other countries use the AUTEC center?

Dr. FROSCH. The Royal Navy has equal user rights at AUTEC and has conducted a number of programs there. Other countries have used the center from time to time. These include Norway, Germany, Italy, and the Netherlands. Canada, New Zealand, Australia, and Turkey have all requested use of the range.

Chairman ELLENDER. Do they contribute to its support?

Dr. FROSCH. All countries except the United Kingdom use the range on a reimbursable basis. United Kingdom programs are afforded the same services as U.S. Navy programs.

Chairman ELLENDER. The funds you are requesting for fiscal year 1973 are $855,000 less than the funds provided for fiscal year 1972. Would you comment on this decrease?

Dr. FROSCH. Budgetary restraints have required that we reduce this program in lieu of higher priority programs.

MANAGEMENT AND TECHNICAL SUPPORT

Chairman ELLENDER. Of the total requested for programwide management and support, $10.3 million is for the program entitled "Management and Technical Support." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

MANAGEMENT AND TECHNICAL SUPPORT

MANAGEMENT AND SUPPORT

Description.—Element combines several management and technical support activities formerly carried as separate elements and is composed of the following projects:

Navy Research and Development Information System (NARDIS).—To provide meaningful and current technical information (products and services) to

support the Navy RDT&E program and to reduce redundancy and costly duplication of effort in the acquisition, storage, retrieval and dissemination of this information.

ASW Tactical and Operational Analysis.—This project includes two major types of work. The first is the planning, reconstruction, and analysis of special exercises to develop and verify effectiveness of operational ASW units. This work is conducted by professional Tactical Analysis Groups (TAGS) located at ten different Atlantic and Pacific fleet commands, including the Submarine and Destroyer Development Groups. The second is to provide assistance to the Director, ASW Programs in his planning, programming, and budgeting activities, to coordinate efforts of operational, technical, and analytical activities in ASW, and in the development of new data bases and effectiveness criteria, both of operational tactics and equipment effectiveness.

ASW system support.—Includes comprehensive direction, coordination and integration necessary to ensure fully supported hardware is developed and produced by several systems commands within Naval Material Command to satisfy approved ASW operational requirements and programs in timely manner. Hardware includes those ASW components and systems involved in surveillance, detection, classification, localization, data processing and display, fire control and related computers and integration devices; ASW weapons, weapon launchers, weapons handling and stowage; ASW countermeasures; ASW communications; and ASW supporting and training equipment.

ASW intelligence support.—Improve Acoustic Intelligence collection systems, develop computer-based analysis facility, and provide equipment and technology to increase exploitation of acoustic data. Results in greater knowledge of acoustic characteristics of threat naval forces.

Work performed by.—Various Naval Activities and contractors such as: Naval Research Laboratory, Naval Ship R. & D. Center, Carderock, Naval Undersea R. & D. Center, San Diego, Naval Weapons Center, Naval Ordnance Laboratory, White Oak, Naval Weapons Lab, Dahlgren, Center for Naval Analysis, A. D. Little, Sanders Assoc., Tetra Tech.

PROGRAM ACCOMPLISHMENT AND FUTURE PROGRAMS

a. *NARDIS.*—Collected, digitized and submitted to Defense Documentation Center (DDC) approximately 23,000 Navy Work Unit Summaries Reports. Currency of the Navy Work Units at DDC improved from less than 30 percent in mid FY 1970 to 98 percent during FY 1971. Reporting requirements were tightened to include all research and technology assigned to the in-house Navy laboratories regardless of type of funding. Quality and coverage of Navy R. & D. were improved.

b. *ASW tactical and operational analysis.*—The Tactical Analysis Group activities have been consolidated under the Operations Evaluation Group of the Center for Naval Analyses. The Tactical Analysis Groups continue to furnish basic fleet exercise design and interpretation of results for exercises such as UPTIDE, SHAREM, Submarine ASW Exercises, and [deleted].

c. *ASW system support.*—Analysis and monitoring of ASW subsystems to determine conformance with requirements; development of analytical tools for evaluation of ASW Systems for DD 963, SSN 688 and the S3A aircraft, and for ASW suite selection of ASW suites for DD 963, SSN 688 platform systems and preparation of systems specifications for those systems.

d. *ASW intelligence support.*—Interim analysis system installed at Naval Scientific and Technical Intelligence Center (NAVSTIC), Acoustic Intelligence Data System (AIDS) hardware and data management software procurred, collection procedures and techniques defined.

Fiscal year 1972 program.—a. *NARDIS.*—Is continuing to collect, digitize and submit to DDC Navy Work unit Summaries for all Navy.

b. *ASW tactical and operational analysis.*—Tactical analysis assistance to fleet commands, analysis of operational data to continually verify fleet ASW effectiveness, mster model development, environmental data standardization, and special critical ASW studies are continuing.

c. *ASW system support.*—Continue systems engineering, systems analysis and configuration management support for ASW platform systems, Command and Control and surveillance as outlined above. Conduct investigations and analyses to expand ship and submarine test programs as required to encompass new construction and new equipments. Investigate requirements and procedures for new ASW aircraft test program, similar to that existing for ships and submarines.

d. *ASW intelligence support.*—Airborne collection capability initiated. Programming of Acoustic Intelligence Data System (AIDS) and investigation of pulse and transient signals continuing.

Fiscal year 1973 planned program.—a. *NARDIS*—Phasing in of data automation at the source will be initiated at selected activities. Work Unit level reporting will evolve to meet changing demands and will be further integrated wtih related management requirements to reduce costs.

b. *ASW tactical and operational analysis.*—ASW effectiveness modeling and performance data standardization will continue and will be further extended to cover coordinated force operations. Continuing assessment of unit effectiveness will be stressed in analytic activities.

c. *ASW system support.*—Systems engineering, systems analysis, and configuration management support for ASW platform systems, Command and Control and surveillance as outlined above will contnue. Direct investigations in following ASW areas for purpose of improving system effectiveness: ASW Command and Control, Fixed Wing Aircraft detection and localization, and ASW platform systems testing.

d. *ASW intelligence support.*—Use of AIDS will be expanded beyond measurement [Deleted] data. Models for automatic classification of threat targets will be developed. [Deleted.]

Resources (In thousands of dollars):

R.D.T. & E. funds for fiscal year 1971, $10,900; fiscal year 1972, $11,121; fiscal year 1973, $10,287; additional funds to completion are continuing; and the total estimated cost is not available.

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the estimate for fiscal year 1973.

Dr. FROSCH. Yes, sir.

(The information follows:)

[In thousands of dollars]

Project	Fiscal year—		
	1971	1972	1973
Navy research and development information systems (NARDIS)	770	1,055	1,000
ASW tactical and operational analysis	2,550	2,750	2,700
ASW systems support	4,400	5,066	4,087
ASW intelligence support	2,550	2,250	2,500

Chairman ELLENDER. Would you comment generally on the kind of support provided under this program element and to whom this support is provided?

Dr. FROSCH. The Navy research and development information system provides inputs to the Defense Documentation Center of documentation of Navy R. & D. research and technology reports. This provides a standardized and centralized library of the products of Navy laboratory effort for the benefit of all users.

ASW tactical and operational analysis supports the tactical analysis groups (TAGS) under a contract with CNA(OEG). TAG teams are located at fleet commands worldwide to assist in the design, analysis, and evaluation of fleet exercises to determine how effectively the fleet can handle the ASW mission. This project also supports coordination of ASW planning, operational and technical activities as directed by the Director, Antisubmarine Warfare.

ASW system support provides for integration of diverse material developments by various components of the Naval Material Command into composite, operationally effective total ASW systems. The support is provided to the manager, ASW systems project in the Naval Material Command.

ASW intelligence support provides for acoustic intelligence investigations and analyses which are unique to the ASW problem. This work is done by the Scientific and Technical Intelligence Center, and is intended to assist in finding submarine acoustic characteristics which can be exploited both by existing and developmental acoustic sensors.

Senator YOUNG. Of the total requested for "Management and technical support," $4.1 million is for the project entitled "ASW system Support." Please comment on this project and tell us what you hope to accomplish with the funds you are requesting.

Dr. FROSCH. The Naval Material Command is responsible for the translation of operational requirements established by the Chief of Naval Operations into integrated hardware systems responsive to the requirment. Extensive systems engineering is essential to insure that development and production of various subsystems conducted by various components of the Naval Material Command have space and weight provided for in the platforms for which they are intended, that power and support requirements are met, and so forth. The manager, ASW systems project is responsible to the Chief of Naval Material for the performance of these functions for all ASW systems. In brief, he is responsible for insuring that multiple pieces of ASW hardware are put together into ASW systems that are responsive to the requirement. It is this objective that is being accomplished on a continuing basis with the funding allocated to the ASW systems support project.

MARINE CORPS SPECIAL LABORATORY SUPPORT

Chairman ELLENDER. $4.3 million is for the program element entitled "Marine Corps special laboratory support." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

SPECIAL LABORATORY SUPPORT

MANAGEMENT AND SUPPORT

Description.—The Commandant of the Marine Corps is responsible for forecasting, planning, and determining the requirements of the Marine Corps for equipment, material, personnel, and supporting services. He is also responsible for the planning, initiation, conduct, and management of the Marine Corps research, development, test and evaluation programs. This Program Element will fund the Marine Corps Development and Education Command for work performed as the designated R.D.T. & D. field representative of the Commandant. Special Laboratory Support will fund research and development activities at the Marine Corps Development and Education Command (MCDEC), Quantico, Virginia. Developmental efforts at MCDEC encompass the procurement and subsequent test, evaluation, and possible modification of equipment prior to introduction into the Fleet Marine Forces. The establishment of test requirements and the conduct/coordination of military potential, engineer, service and troop tests, and evaluation for development items fall into the following areas: ground operations; air operations; mobility and support, communications and electronics; studies and requirements; organization, doctrine, tactics and techniques; and tactical data systems. Currently, about 200 tasks have been assigned to MCDEC by the Commandant of the Marine Corps.

Work performed by.—The majority of the work performed under this Program Element is accomplished by the Marine Corps Development and Education Command (MCDEC), Quantico, Virginia. At the same time, such commercial firms as

Triangle Research Corporation, Alexandria, Virginia (war gaming); Potomac Research Corporation, Baileys Crossroads, Virginia (management analysis (consultation)); Honeywell Incorporated, Minneapolis, Minnesota (stabilized line-of-sight tracking); Syracuse University Research Corporation, Syracuse, New York (A6A Beacon); Morton Salt Company, Philadelphia, Pennsylvania (fog dispersal); and J. I. Case Company, Racine, Wisconsin (engineer equipment) are utilized for technical support and to obtain equipment for test and evaluation.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1971 and prior accomplishments.—No specific total milestones can be identified due to the wide, varied nature of the work performed under this program element. However, FY 1971 and prior efforts include the following:

Fiscal year 1972 program.—Work planned by MCDEC during FY 1972 includes: evaluation of a remote plotting system; development of a laser facsimile transceiver; confirmatory testing of LVTP–7 production vehicles; evaluation of pressure jet stream cleaners; development of mid and long range plans; evaluation of warm fog dispersal systems; evaluation of remote ground unit locating devices. In addition to the above programs, work will continue on many additional projects varying from Harrier to mine and booby trap detection, neutralization and breaching.

Fiscal year 1973 planned program.—The wide scope of efforts assigned in the past will continue throughout FY 1973. Specific efforts which will be continued during FY 1973 include: hostile weapons locator system; helicopter tactics in an infrared/surface-to-air missile environment; battlefield surveillance radar detection/countermeasure systems; trans-location by navigation satellite; tactical command, control, and communication systems; tactical data automatic switching; lightweight assault bridges, tactical warfare analysis and evaluation system; tactical exercise simulation; war games; silent outboard motors; modernization of drafting equipment sets; and, the multi-shot portable flame weapon.

Resources (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, $4,708; fiscal year 1972, $2,900; fiscal year 1973, $4,310; additional funds to Completion are continuing; and the total estimated cost is not available.

Chairman ELLENDER. Comment generally on the objectives of this program, and tell us what you will do with the funds you are requesting.

General BROOKS. This program element will fund the Marine Corps Development and Education Command (MCDEC), Quantico, Va., for work performed as the designated R.D.T. & E. field representative of the commandant. Developmental efforts at MCDEC encompass the procurement and subsequent test, evaluation, and possible modification of equipment prior to introduction into the fleet marine forces. The establishment of test requirements and the conduct/coordination of military potential, engineer, service and troop tests, and evaluation for development items fall into such areas as ground operations, air operations, mobility and support, communications and electronics, studies and requirements, organization, doctrine, tactics and techniques, and tactical data systems. Specific efforts which will be pursued during fiscal year 1973 include: Hostile weapons locator system; helicopter tactics in an infrared/surface-to-air missile environment; battlefield surveillance radar detection/countermeasure systems; translocation by navigation satellite; tactical command, control, and communication systems; tactical data automatic switching; lightweight assault bridges; tactical warfare analysis and evaluation system; tactical exercise simulation; war games; silent outboard motors; modernization of drafting equipment sets; and, the multishot portable flame weapon.

Senator YOUNG. Why do you need the increase of $1.4 million you are requesting?

General Brooks. While the fiscal year 1972 estimate for this element was $2.9 million, $4.2 million was actually provided to the Marine Corps Development and Education Command (MCDEC). Thus, the fiscal year 1973 figure of $4.3 million represents only a minimal increase in the MCDEC funding level.

NAVAL ARCTIC RESEARCH LABORATORY, POINT BARROW

Chairman Ellender. $4.5 million is requested for the support of the Naval Arctic Research Laboratory at Point Barrow, Alaska. Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Naval Arctic Research Laboratory

Category: Management and Support

Budget Activity: 8-Programwide Management and Support

DESCRIPTION: The Department of the Navy agreed to the Air Force request to have the Navy assume host jurisdiction at the Naval Arctic Research Laboratory (NARL) site, Barrow, Alaska, effective on 1 July 1972. Since 1966, the Air Force, as host, has provided the basic logistic support of military activities including the NARL in conjunction with construction and operation of the DEW line in the Point Barrow area, and partial support for the Navy facilities and services has been budgeted for by the Air Force, principally under the Operation and Maintenance, Air Force appropriation. Air Force activities have declined in the Barrow area and a major portion of the support capability provided by the Air Force at the Barrow site is utilized by the Office of Naval Research in support of the NARL. Details of the transfer are now being developed. Extensive revisions will be necessary to current real property licenses, personal property accounts, research support contracts, maintenance and operations contracts and logistic support arrangements. NARL is the only continuously operated U.S. research laboratory in the Arctic and fulfills Navy and other government research requirements in the region. The objective of this project is to provide for the net maintenance and operation costs of the NARL, Barrow, Alaska site. The Navy, as Host, will make appropriate reimbursable logistic support available to all tenants. Such reimbursable costs have been excluded from the costs of this project, and only the net costs are included herein. This project provides for functions such as facilities maintenance, utilities generation and distribution, motor vehicle operation and maintenance, fire protection and security, janitorial service, communications, airport operation, medical support, food service, and provision of special services, including laundry, recreation and resale activities. Other major costs include subsistence (commissary supplies), general support supplies, commercial air transportation costs, equipment and related items.

WORK PERFORMED BY: The current contract, let by the Alaskan Air Command, is with Pacific Architects and Engineering, Seattle, Washington.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program: Funded by the Department of the Air Force.

FY 1973 Planned Program: Funds in the amount of $4.5 million are required for the items enumerated in "Description," above.

RESOURCES: ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	$ -a/	$ -a/	$ 4,500	Continuing	NA

a/ Funded by the Department of the Air Force.

NAVAL ARCTIC RESEARCH LABORATORY, POINT BARROW

Chairman ELLENDER. Please explain what arrangements the Navy and the Air Force have had in the past for the use of this facility and why the Navy has agreed to take over its support.

Dr. FROSCH. The Naval Arctic Research Laboratory is a Navy-owned contractor-operated research facility located about 4 miles north of Barrow, Alaska, the largest Eskimo village in the State, and about 6 miles south of Point Barrow. During the past 24 years the Laboratory has played a vital role in serving the Arctic research and engineering needs of the Navy and many other Government agencies. The Air Force was given a permit to use most of the Navy Barow campsite in December 1954 for the purpose of constructing and supporting the DEW line sites across the northern coast of Alaska and Canada. In January 1955 the Navy transferred most of the supplies at the site, including equipment, petroleum, and food stocks, to the Air Force. In return, the Air Force agreed to provide certain general logistic support to the Navy at no cost for the duration of the permit, and the Air Force has continued to provide a major portion of the logistic support of the Naval Arctic Research Laboratory. However, Air Force interest and activity at Barrow have declined considerably since completion of the DEW line sites, and following deactivation of many of these stations. As Air Force activity declined in the area, the Office of Naval Research became the dominant user of the camp facilities and services. In recognition of this fact, an agreement between the Navy and the Air Force was made in January 1971 to transfer host jurisdiction of the Barrow facility to the Navy effective on July 1, 1972. In fiscal year 1973, $4,500,000 is requested for continuation of the support previously provided by the Air Force.

Chairman ELLENDER. Can you tell us how much the Air Force contributed to the support of this facility in fiscal years 1971 and 1972?

Dr. FROSCH. Contractual and logistic support provided by the Air Force from all sources is approximately $4.4 million in both fiscal years.

STRATEGIC TECHNICAL SUPPORT

Chairman ELLENDER. $1.7 million is for the program element entitled "Strategic technical support." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

STRATEGIC TECHNICAL SUPPORT

MANAGEMENT AND SUPPORT

Description.—The Management and Technical Support, Strategic Project (R1513) provides for system studies, advanced technical investigations, and analysis of potential future sea based strategic systems. In addition, the Advanced Ballistic Re-Entry Systems (ABRES) project (J1510) supports development work on advanced ballistic missile re-entry concepts and designs by identifying to the ABRES Manager (U.S. Air Force) the technology which is required for potential Navy strategic systems.

Work performed by.—Naval Ordnance Laboratory, White Oak, Maryland; Lockheed, Sunnyvale, Calif.; Lulejian Inc., Redondo Beach, Calif.; TRW, Calif.; General Research Corporation, Rosselyn, Virginia; Academy for Interscience Methodology, Rockville, Maryland.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—a. J1510—ABRES Support: Monitor the ABRES program for FBM applicability.

Management and Technical Support, Strategic: Continue projects commenced prior to FY 1972 and investigate [deleted] weapon system trade-offs, [deleted] concepts development, analytical support (Nucelar Vulnerability/Weapon Effects), and analytical methods for strategic analysis.

Fiscal year 1973 planned program.—Advanced Ballistic Re-Entry Systems (ABRES) Support: A continued level of effort in reviewing the technology generated by ABRES necessary to insure that the Navy can identify, in specific terms, the technology required to enter advanced or engineering development for future Navy systems.

Management and Technical Support, Strategic: Continue investigations, and analysis of potential future sea-based strategic systems.

Resources (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, $2,000; fiscal year 1972, $1,200; fiscal year 1973, $1,688; additional funds to completion are continuing; and the total estimated cost is not available.

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for fiscal years 1971 and 1972 and the request for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

TABULATION OF PROJECTS FUNDED

[In thousands of dollars]

Title	Fiscal year—		
	1971	1972	1973
Advanced ballistic reentry systems (ABRES)	500	500	500
Computer services supporting	60	80	45
Advanced Technical Objectives Working Group (ATWOG) assessment of future capability strategic deterrence		150	275
Survivability and effectiveness of sea-based det force		49	
Strategic weapon allocation	30	30	50
Strategic engagement analyses techniques and applications	88	97	130
Weapon system effectiveness tradeoff analysis		70	200
[Deleted] missile mission analysis	15		100
Nuclear cloud study	45		
Integrated offense/defense analyses	160	115	125
SALT support analysis	82		
Utility of real time MIRV retargeting			50
Integrated advanced sea-based missile systems	148	109	125
Strategic systems vulnerability/survivability analysis	50		100
Surface ballistic missile ship concept analysis	248		
Weapon characteristic study	92		
SABMIS supporting surveillance system	97		
Coastal antimissile system study	37		
Strategic defensive systems study	47		
Strategic mission functions analysis	42		
AMMIS study	10		
MIRV missile targeting analysis	199		
Bomber allocation model	9		
Electromagnetic pulse analysis	26		

Chairman ELLENDER. Comment on the objectives of this program and tell us why you need the increase of $488,000 you are requesting.

Dr. FROSCH. The objectives are to provide funds for strategic systems studies, advanced technical investigation of strategic concepts and analyses of potential future sea-based strategic systems. Failure to fully fund the strategic technical support program element would not only seriously disrupt the ongoing strategic study effort but also seriously impinge on the continuity of the study program in succeeding years. Specifically, the following impact would result:

(*a*) The inability to determine optimum weapon characteristics, targeting concepts, employment and basing practices of current and programed sea-based weapon systems (i.e. Poseidon and ULMS).

(*b*) Limit the advanced technical objectives working group (ATOWG) investigations of advanced strategic concepts which endeavor: (1) to identify techniques for strategic deterrence in the post-1980 time frame, (2) to examine the Navy's future capabilities and needs to support new techniques of strategic sea-based deterrence, and (3) to establish guidelines for R. & D. to provide maximum flexibility in strategic systems.

(*c*) Curtail the limited support of Navy participation in the Air Force-managed DOD advanced ballistic reentry systems (AMRES) program.

(*d*) Reduced level of effort in investigating the vulenerability of surface ships and aircraft to nuclear effects. Iittle is known about the effects of electromagnetic pulse to the operational reliability of combatant units depending heavily on the effectiveness of electronic equipments in the nuclear combat environment.

INTERNATIONAL R.D.T. & E.

Chairman ELLENDER. $570,000 is requested for the program entitled "International R.D.T. & E." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

INTERNATIONAL RESEARCH, DEVELOPMENT, TEST AND EVALUATION

MANAGEMENT AND SUPPORT

Description.—Provides for management, direction and execution of Navy's programs for cooperation in International R&D. Purpose is to provide for exchange of technical information and participation in cooperative bilateral, multilateral and NATO RDT&E programs in support of mutual requirements.

Provides salaries and administrative support for nine U.S. civilian scientific personnel assigned to the SACLANT ASW Research Centre. Personnel fulfill U.S. commitments to the Centre. Centre's mission is to provide scientific and technical advice and assistance to SACLANT in field of anti-submarine warfare, and to be responsive through SACLANT to requirements of NATO naval forces. Centre also gives scientific and technical assistance to NATO nations requesting aid with anti-submarine warfare problems.

Work performed by.—Chief of Naval Operations, Office of Naval Research, Washington, Office of Naval Research Branch Office, London, Supreme Allied Command Atlantic Anti-Submarine Warfare Research Center, La Spezia, Italy and various elements of the Department of the Navy as appropriate.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 *programs.*—1972 program continues to support cooperative research and development, test and evaluation programs of mutual interest.

SACLANT ASW Research Center project continues, as described, under "Military Assistance, Executive" appropriation. Funding however, continues to be provided under "Research, Development, Test and Evaluation, Navy" appropriation.

Fiscal year 1973 *planned program.*—1973 plans are for continuation of cooperative research, development, test and evaluation support of mutual interest programs as dictated by advancing naval requirements.

Resources (in thousands of dollars):

RDT & EN funds for fiscal year 1971, $464,000; fiscal year 1972, $564,000; fiscal year 1973, $570,000; additional funds to completion are continuing; and the total estimated cost is not available.

INTERNATIONAL R.D.T. & E.

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the request for fiscal year 1973.

Dr. FROSCH. Yes, sir.

(The information follows:)

	Fiscal year 1971	Fiscal year 1972	Request, fiscal year 1973
International cooperative:			
R.D.T. & E.	$225,000	$250,000	$250,000
Saclant ASW Research Center	239,000	314,000	320,000
Total	464,000	564,000	570,000

Senator YOUNG. Please describe the general objectives of this program, and tell us what you will do with the funds you are requesting for fiscal year 1973.

Dr. FROSCH. The Navy continues, as it has for a number of years, to enter into meaningful and productive cooperative R. & D. programs with our allies. Our objectives are to focus on eliminating unnecessary redundancy in the development of equipment by the United States and its allies and take advantage of weapon systems developed by allied nations which might be suitable for U.S. needs; to encourage cooperation and give emphasis to qualitative improvements in alliance defense, to enhance cooperation ultimately evidenced in the form of achieving system compatibility and increased universality and/or standardization of weapons systems; to contribute to free world and NATO-wide cohesion and to maximize the return on U.S. investment in R. & D. By a sharing of technology and embarking on a cooperative development in the beginning, to lead to earlier development of the required product and through joint efforts to further cement the defense ties with our allies.

Funds will be used to provide administrative, travel, and per diem support for Navy experts to participate in international cooperative R. & D. meetings, observation of trials, tests and investigation of technological advances in allied countries. Funds in the SACLANT ASW Research Centre project will be used to provide salaries and administrative support for a contingent of nine U.S. civilian scientific personnel assigned to the Centre in La Spezia, Italy. These personnel fulfill most of the U.S. commitments to the Centre. The project further provides for U.S. liaison support to the Centre and assistance to the Director of the Centre in obtaining U.S. scientists on temporary assignments.

Chairman ELLENDER. Do any of the other services contribute to this program?

Dr. FROSCH. No, sir; the other services do not contribute to this program?

TACTICAL ELECTRONICS SUPPORT

Chairman ELLENDER. $5.1 million is requested for the program element entitled "Tactical Electronics Support." Selected paragraphs from the descriptive summary will be included in the record at this point.

(The information follows:)

FY 1973 RDT&E DESCRIPTIVE SUMMARY

Title: Tactical Electromagnetic Support

Category: Management and Support

Budget Activity: 8-Program-Wide Management and Support

DESCRIPTION: This program provides a means for actively pursuing new ideas, concepts and hardware to ensure our Fleet units have the most modern hardware in the command support mission area and a means of identifying, attacking and correcting the electromagnetic interference problems which exist throughout the Navy.

WORK PERFORMED BY: Naval Ship Engineering Center, Washington, D. C.; Naval Ship Engineering Center, Norfolk, Virginia; Naval Electronics Laboratory Center, San Diego, California; General Electric Corporation, Daytona Beach, Florida; Electromagnetic Compatibility Analysis Center, Annapolis, Maryland; Atlantic Research Corporation, Alexandria, Virginia, Naval Air Test Center, Patuxent River, Maryland.

PROGRAM ACCOMPLISHMENTS & FUTURE PROGRAMS:

FY 1972 Program: Eight spectrum signatures will be measured. A funding deficiency exists in this area. Using SEMCA and ECAC models, specific predicted electromagnetic (EM) environments will be specified for use as guidance by subsystem development activities to ensure subsystem compatibility requirements of [CVA] environment are included in subsystem specifications. Methods of relating ECAC and SEMCA prediction outputs to receiver performance degradation have been initiated. These investigations will provide a necessary ingredient (assessment of receiver output degradation and operator interface) in determining the electromagnetic effectiveness of ship systems. Initial start will consider the following modulation cases; A3 to A3, A3 to PO, F3 to F3, F3 to PO, and A3J to A3J. Provide the necessary consultation services to Electromagnetic Compatibility Analysis Center (ECAC) for implementation of Shipboard Electromagnetic Compatibility Analysis (SEMCA) on ECAC Computers. SEMCA (SCAT) was implemented on Naval Ship Research and Development Center Computers for general Navy/Industrial shipbuilder availability. An effectiveness model catalog was published for use by subsystem designers.

FY 1973 Planned Program: Electromagnetic shipboard and equipment spectrum signature measurements will progress at a constant rate. Studies and analysis will be conducted to identify the most serious electromagnetic compatibility areas and methods of solving the problems will be devised. In the command support area, studies and equipment evaluations will be undertaken to develop concepts and real-time, integrated command and control systems for use both afloat and ashore.

RESOURCES ($ in Thousands)

	FY 1971	FY 1972	FY 1973	Additional to Completion	Total Estimated Cost
RDT&EN Funds	926	1,615	5,099	Continuing	N/A

TABULATION OF PROJECTS TO BE FUNDED

Chairman ELLENDER. Please provide a tabulation for the record listing the projects to be funded, the amounts for each for fiscal years 1971 and 1972, and the estimate for fiscal year 1973.

Dr. FROSCH. I will be glad to do so.

(The information follows:)

[In thousands of dollars]

Project number	Name	Fiscal year—		
		1971	1972	1973
SF-099-90	Electromagnetic compatibility and effectiveness	926	1,009	1,019
X31YY	Communications, intelligence, reconnaissance support		206	2,080
W33XX	Tactical electromagnetic support		400	2,000

Chairman ELLENDER. Comment on your planned program for fiscal year 1973 and tell us why you need the increase of $3.5 million you are requesting.

Dr. FROSCH. Recently within OPNAV, CNO created the Office of the Director of Command Support Programs and the Office of Director of Tactical Electromagnetic Programs. This was done in order to bring, under specific individuals, those specific functional areas which support all commanders whether they be located in carriers, cruisers, or ashore. The functional areas for the Director of Command Support Programs are communications, surveillance, intelligence, command and control, et cetera.

The functional areas for the Director, Tactical Electromagnetic Programs are all tactical systems and equipments which utilize electromagnetic propagation for offensive or defensive purposes. The tally of equipments in this functional area include radars, passive microwave detection devices, weapons fire control systems, naval tactical data systems, and electronic warfare systems. To support the directors in this immense task of integration and improvement, management and support funds are required to define existing problem areas and to evaluate ways to correct and improve our command support posture. As a first effort, in command support, funds in fiscal year 1972 are being used and will be used in fiscal year 1973 to conduct a requirements analysis of our fleet Cinc's command centers and to develop a plan and necessary documentation to support an evolutionary improvement in these command centers. When completed the analysis and plan should provide the Navy with a way to integrate and display in one center that information required for the fleet Cinc to make meaningful decisions, disseminate these decisions, and keep the National Command Authority apprised, all on a near real-time basis.

As a first effort in the tactical electromagnetic programs, funds in fiscal year 1972 are being used to conduct requirements and compatibility analysis of current installed shipboard electronics with the view of developing a data base for future planning. During fiscal year 1973, these efforts will be continued to isolate the methodologies for the design and evaluation of integrated electromagnetic tactical systems. An implementation plan will be developed which will allow the Navy to more effectively utilize it's funding in developing combat systems.

ANTISHIP MISSILE DEFENSE TEST RANGE

Chairman ELLENDER. $5 million is for what seems to be a new program element entitled "Antiship missile defense test range." Selected paragraphs from the descriptive summary will be placed in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. DESCRIPTIVE SUMMARY

ASMD TEST RANGE

MANAGEMENT AND SUPPORT

Background.—A centrally managed Anti-Ship Missile Defense (ASMD) Program has been established to coordinate all efforts leading to improved fleet capability in defense against attack by anti-ship missiles. As part of this effort, it has been determined that a facility is needed where the total combat system of a ship can be tested for ASMD effectiveness. Such a facility would be used to measure overall system effectiveness and should provide for accurate and rapid evaluation of the effect of adding new system components or of modifying existing equipment. This should permit us to identify and reject proposed components or modifications which do not really improve effectiveness.

Description.—[Deleted.]

Related activities.—Current navy efforts to collect and evaluate total combat system performance in monitored-fleet or individual ship performance on established test ranges. (Pacific Missile Range, Atlantic Fleet Weapons Range)

Work performed by.—Applied Physics Laboratory, Johns Hopkins University, Maryland; Sanders Associates, New Hampshire; American Electronics Laboratories, Pennsylvania, Systems Consultants, Inc., Washington, D.C.; Univac Corp., Minnesota; RCA, California; Sperry Corp., New York; Raytheon, Massachusetts; and Navy field activities.

PROGRAM ACCOMPLISHMENTS AND FUTURE PLANS

Fiscal year 1971 and prior accomplishments.—None.

Fiscal year 1972.—None.

Fiscal year 1973 planned program.—Develop a detailed plan for the facilities, equipment and capabilities required in the ASMD Test Range. Initiate procurements of long-lead equipments and establish technical support for the task.

Program to completion.—Continue FY 1973 efforts. Initiate contracts for procurements to support the test range mission and objectives. It is anticipated that test range facilities will have to be updated frequently as new capabilities are observed in missile systems deployed by potential enemies.

Resources (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971, none; fiscal year 1972, none; fiscal year 1973, $5,000; additional funds to completion are continuing; and the total cost is not available.

ANTISHIP MISSILE DEFENSE TEST RANGE

Chairman ELLENDER. At what stage of development is this range, and where is it located?

Dr. FROSCH. The program is not intended to establish a new test range for ASMD, but increase the capability of existing sea test ranges (such as the Pacific Missile Range and the Atlantic Fleet Weapons Range) to properly support ASMD technical and operational evaluations in a broader more comprehensive basis. The plan for improving these ranges has been completed and is currently in review by senior representatives of the participating systems commands and Opnav sponsors. The plan is scheduled for approval in June 1972.

Senator YOUNG. What will you do with the $5 million you are requesting for fiscal year 1973?

Dr. FROSCH. The fiscal year 1973 resources will be directed toward increased capability to provide more realistic targets and simulators with attendant improvements in precision tracking and control devices to properly evaluate the defensive and offensive capabilities of ASMD equipped ships. [Deleted.]

U.S.S. HIP POCKET

Chairman ELLENDER. $3 million is requested for the program element entitled "U.S.S. Hip Pocket." Selected paragraphs from the descriptive summary will be placed in the record at this point.

(The information follows:)

R.D.T. & E. DESCRIPTIVE SUMMARY

U.S.S. HIP POCKET

MANAGEMENT AND SUPPORT

Description.—An increase in ASMD readiness is required, and can be achieved through utilization of new sensors and weapons, or through utilization of improved methods in the currently installed sensors, countermeasures and weapons. [Deleted.] This initiative would provide for modification, installation, test and removal of equipments installed for experimental evaluation in a suitable combatant ship capable of being employed in tactical operations. The thrust of this effort would:

a. Exploit new ideas rapidly.

b. Motivate creative and innovative people.

c. Evaluate technological risk at minimum cost.

The gain expected is two-fold, i.e., a real increase in ASMD readiness in addition of combinations of hardware in various stages of development, and an increase of readiness which will be gained by the rapid evaluation of new concepts and technology which would accelerate normal development and procurement processes.

Work performed by.—Naval Ordnance Laboratory, Cuttler-Hammer, Hughes, Ryan-Teledyne and others as required.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1972 program.—The FY–72 funding will install and test the concept of exploiting new ideas rapidly and inexpensively. This entails the least degree of sophistication, the lowest possible cost and a means of evaluating risk technology with the least number of dollars. The FY–72 equipments will include: [Deleted.]

Fiscal year 1973 program.—Participate in [deleted] fleet exercises, and deploy [deleted] fleet during the first quarter of FY–73. Those equipments which appear valuable will undergo continuing evaluation during fleet employment in the tactical conditions of fleet deployment. An additional ship will be designated for the continuing effort of exploitation of technology and equipment aboard a combatant ship in a tactical environment.

Program to completion.—Equipment performance will be validated. There effects are expected from this project:

a. Equipments which are fully suitable will be placed in service approval status.

b. Equipments which show technological or operational promise, but are not wholly suitable, will be placed in specific development status.

c. Equipments which are unsuitable and display no promise will be rapidly discarded.

Resources (In thousands of dollars):

R.D.T. & E.N. funds for fiscal year 1971 and prior, none; fiscal year 1972, $600; fiscal year 1973, $3,000; additional funds to completion and not yet determined; total estimated cost is not available.

U.S.S. HIP POCKET

Chairman ELLENDER. Exactly what does the name "U.S.S. Hip Pocket" refer to?

Dr. FROSCH. "U.S.S. Hip Pocket" is the project title for the program which permits selected Government and industry candidate equipments to receive rapid Navy evaluation of their potential contributions to antiship missile defense through controlled at-sea testing aboard ship at sea. Those equipments which demonstrate high potential are recommended for further development to enable service approval after full operational evaluation and test.

Senator YOUNG. Tell us what you accomplished with the $600,000 provided in fiscal year 1972?

Dr. FROSCH. Candidate equipments were selected by a committee composed of navy laboratory and systems command representatives, installed aboard U.S.S. *Lawrence* (DDG–4) and evaluated at sea in controlled tests against simulated threats. The equipments included a special purpose ASMD radar, electronic warfare detection system, [deleted] missile systems and a variety of decoys. The results of the at-sea testing indicated high ASMD potential in the number of the equipments. These equipments will remain aboard the test ship to enable additional test in an operational environment during deployment to the 6th Fleet.

Chairman ELLENDER. How have antiship missile defense programs been tested before this development program?

Dr. FROSCH. Principally through a rigorous land-based integration and performance evaluation followed by at-sea operational evaluation leading to service approval of new systems. Project Hip Pocket, however, is not a test project for authorized ASMD program equipments. Hip Pocket enables the U.S. Navy to review and test any feasible ASMD concept or selected laboratory prototype or equipments to determine possible contributions to the ASMD effort. If a high potential is determined to exist, the concept or equipment is recommended for further development and subsequent procurement for selected fleet units.

Senator YOUNG. As stated earlier, $600,000 was provided in fiscal year 1972 and you are requesting $3 million for fiscal year 1973. Why do you need this extremely large increase?

Dr. FROSCH. Project Hip Pocket was approved and funded in the latter part of fiscal year 1972. Because of this late initiation of the project, the fiscal year 1972 effort was limited in regard to equipment selection and test ship availability. In fiscal year 1973, it is intended to select several test ships and increase the number of concepts/equipments selected for evaluation in an operational environment.

FEDERAL CONTRACT RESEARCH CENTERS

Chairman ELLENDER. The total budget request for research and development for the Navy includes $50 million for work to be performed by the various Federal Contract Research Centers. Other Navy appropriations include an additional $12.3 million for work to be performed by these organizations, as follows: Shipbuilding and conversion, $50,000; Procurement of aircraft and missiles, $1.1 million; Operation and

maintenance, $10.9 million; and Other procurement, $325,000. The tabulation appearing on page 89 of the justifications will be included in the record at this point.

(The information follows:)

TOTAL PROGRAM SUMMARY BY APPROPRIATION

	Fiscal year—		
	1971	1972	1973
Research, development, test, and evaluation, Navy	$43,159	[1] $45,465	$49,995
Shipbuilding and conversion, Navy		66	50
Procurement of aircraft and missiles, Navy	875	2,480	1,050
Operations and maintenance, Navy	7,573	10,636	10,878
Other procurement, Navy	2,557	684	325
Total Federal contract research centers (in-house effort)	54,164	59,331	62,298
Subcontract effort and computer services excluded from this amount	18,246	20,276	28,288

[1] Excludes $1,300,000 to be accomplished at the Aerospace Corp. under Air Force ceiling.

Chairman ELLENDER. I note on this tabulation a notation that the $62.3 million does not include $28.3 million for subcontract effort and computer services. Just what is the nature of this subcontract effort and computer services?

Admiral DAVIES. The Navy's Federal Contract Research Centers procure from outside sources where practical and cost effective those materials, services, and equipments which are required to conduct business and to carry out development missions and technical assignments in an efficient and productive manner. Historically, the hardware development role of these laboratories in the exploration and demonstration of new systems culminating in prototype testing and operational testing and systems evaluation has required the extensive utilization of resources beyond those available in the laboratories. It has been the policy to use subcontracting as a means for exploiting the unique technological skills or resources that may exist in industry or other organizations without having to develop in each case an equivalent inhouse capability. A significant byproduct of this activity is the acceleration of the development of qualified industrial sources of components and subsystems available for future Navy production needs. The magnitude of subcontracting varies significantly from one year to the next depending on the requirements of the particular programs involved.

The funds for computer services are those provided by Government agencies for utilization of the Government-owned IBM 360/91 computer at Johns Hopkins Applied Physics Laboratory.

APPLIED PHYSICS LABORATORY (JOHNS HOPKINS UNIVERSITY)

Chairman ELLENDER. A total of $31.5 million is requested for research and development work to be performed by the Applied Physics Laboratory at Johns Hopkins University. Other Navy appropriations include approximately $11.1 million for work to be performed by the laboratory, for a total of $42.6 millions. The tabulation appearing on pages 84 and 85 of justifications, giving the sources of funding of this $42.6 million, will be included in the record at this point.

(The information follows:)

FEDERAL CONTRACT RESEARCH CENTERS SUMMARY BY APPROPRIATION AND ELEMENT—APPLIED PHYSICS LABORATORY, JOHNS HOPKINS UNIVERSITY

[In thousands of dollars]

	Fiscal year—		
	1971 actual	1972 estimate	1973 estimate
Research, development, test and evaluation, Navy appropriation:			
11221N—Fleet ballistic missile system	3,194	3,152	3,625
11224N—SSBN (ballistic missile submarine nuclear) defense	6,581	6,523	[Deleted]
11315N—Fleet Ballistic Missile Command and control	642	200	[Deleted]
24122N—F14 squadrons	93		
24412N—Destroyers	75	200	700
25677N—Air-surface weaponry (operational systems)	75		
25678N—Surface defensive systems (operational systems)	1,070	1,431	250
31023N—Mapping, charting, and geodesy	95	78	100
34111N—Special activities	423	[Deleted]	[Deleted]
61151N—Research	85	113	205
62751N—Target surveillance technology			100
62753N—Weapronry technology	2,716	3,340	4,240
63352N—Ship-launched weaponry, systems and technology (advanced)	793	725	450
63359N—Antiship weaponry (advanced)	2,205	1,584	1,200
63451N—Space technology (advanced)	281	[Deleted]	[Deleted]
63551N—Surface platforms (advanced)	810	14	400
63562N—Submarine tactical warfare systems (advanced)	183	[Deleted]	[Deleted]
63751N—Electromagnetic optical systems (advanced)	609	500	1,000
64255N—Air electronic warfare (engineering)	1,707	[Deleted]	[Deleted]
64352N—Surface-launched weaponry, systems and technology (eingineering)	2,551	3,716	4,150
64356N—AEGIS (eingineering)	1,142	3,349	3,000
64651N—Ordnance and fuzing (engineering)	185	86	
64765M—Other Marine Corps developments (engineering)	78		85
65152N—Studies and analyses support, Navy	855	248	330
65352N—Missile/weapons systems test and instrumentation	380		
65853N—Management and technical support	276	40	
Total research, development, test, and evaluation, Navy appropriation	27,104	28,028	31,485
Operations and maintenance, Navy:			
11221N—Fleet ballistic missile system	4,528	5,774	6,240
11315N—Fleet Ballistic Missile Command and control system	403	467	900
24141N—Attack carriers	45	112	
31022N—Scientific and technical intelligence	364	292	370
31023N—Mapping, charting, and geodesy	176	714	750
35896N—Base operations		509	400
78012N—Logistic support activities	1,518	1,596	1,040
78017N—Maintenance support activities	10		
Total operations and maintenance, Navy	7,044	9,464	9,700
Procurement of aircraft and missiles, Navy:			
11221N—Fleet ballistic missile system	755	639	440
24114N—A-6 squadrons			350
24129N—Aviation support tactical air		505	
24411N—Fleet escort	120	826	160
24412N—Destroyer		510	75
65302N—Missile/weapons systems test and instrumentation			25
Total procurement of aircraft and missiles, Navy	875	2,480	1,050
Shipbuilding and conversion, Navy:			
24411N—Fleet escort		16	50
24413N—Antisubmarine warfare escorts		50	
Total shipbuilding and conversion, Navy		66	50
Other procurement, Navy:			
24141N—Attack carriers	216	80	50
24296N—Weapons range support	651		50
24497N—Training	603	140	25
31023N—Mapping, charting, and geodesy	112	22	200
34411N—Special activities	15		
78012N—Logistic support	251		
Total other procurement, Navy	1,848	242	325
Total Applied Physics Laboratory, John Hopkins University	36,871	40,280	42,610

Fleet Ballistic Missile System

Chairman Ellender. Of the total requested for work by this organization, $3.6 million is for work on the fleet ballistic missile system. What is the nature of the work to be performed by the Applied Physics Laboratory with these funds?

Admiral Davies. This work includes effort in the transit improvement program (TIP), improvement to the BRN–3 system and vulnerability and effectiveness studies.

The TIP program has the prime objective of [deleted] the Navy navigation satellite to provide a cost effective [deleted]. The program features development of radioisotope thermoelectric generator to replace the vulnerable solar cell as the satellite's power source. The satellite design also incorporates a disturbance compensation system (Discos) to allow precise orbital position prediction of the satellites.

Improvements to the BRN–3 system, which is the shipboard navigation satellite receiver system, includes principally analysis and computer programing for the Poseidon weapon system.

Vulnerability and effectiveness studies are also conducted in the operational navigation satellite system. These consist of investigating the potential for achieving reduced submarine antenna exposure time through long-term orbit prediction technique, use of cesium frequency standards aboard FBM users, and modification to the satellite transmitted orbital data.

Ballistic Missile Submarine

Senator Young. Please comment on the work to be performed with the funds requested for the ballistic missile submarine.

Admiral Davies. The purpose of the SSBN defense program is to investigate and develop the relevant technologies in an attempt to insure the long term survivability of the fleet ballistic missile force. The Applied Physics Laboratory is the primary technical support agency for this program which include 14 areas of effort. These are systems evaluation, acoustic sensors, [deleted], acoustic detection, evasion technology, [deleted] sensors, magnetics, infrasonics, [deleted] quieting, [deleted] measurements, threat evaluation, hydrodynamics, at sea measurement and [deleted] sensors. Let me give a brief description of each of these efforts.

1. SYSTEMS EVALUATION

The purpose of the systems evaluation effort is to establish a performance baseline by: (a) quantifying the capability of current equipment under a wide variety of propagation conditions; (b) evaluating advanced sonar systems in the laboratory [deleted] and (c) determining the impact of technological advances on SSBN survivability.

2. ACOUSTIC SENSORS

An acoustic [deleted] and [deleted] are being developed and tested to explore the present limits of sensor technology. The acoustic sensors effort is examining the [deleted] to determine the relative merits of each. This effort will establish sensor capabilities potentially available to SSBN's as well as the enemy in the future.

3. ACOUSTIC DETECTION

The objective of the technology is to determine how far [deleted] can improve passive acoustic detection and submarine [deleted] capabilities. The sonar processing system developed in fiscal year 1972 will be interfaced with a [deleted] to achieve [deleted].

4. EVASION

Evasion technology and devices will be extended tothe point where [deleted] can be specified. This program includes the development and at-sea demonstration of [deleted] as well as the development of simulations to evaluate the performance of [deleted].

5. [DELETED] SENSORS

This effort will determine the submarine [deleted] of various sensors which sense [deleted] will be constructed and an airborne platform will be used to measure [deleted]. This effort includes the evaluation of the detection potential of current and future sensors, [deleted].

6. MAGNETICS

All of the [deleted] on SSBN signatures, [deleted] will be correlated with results that will have been obtained on [deleted] to statistically determine [deleted] to SSBN's. If a significant threat evolves, R. & D. on degaussing systems will be continued in time and enlarge in scope. Extensive at-sea tests employing the British nuclear submarine HMS *Valiant*, [deleted] will employ [deleted].

7. INFRASONICS

[Deleted] has been examined as a potentially detectable characteristic of submarines. An at-sea test program will be extended to include optimized sensors. Analysis of implications to SSBN survivability [deleted].

8. [DELETED]

In addition to evaluation of advanced [deleted] studies will be made of [deleted].

9. QUIETING

The objective of the quieting effort is to determine how far active [deleted]. In fiscal year 1973, a [deleted] will be demonstrated on a [deleted]. In addition, it will be determined whether CLAS can be applied effectively to the [deleted].

10. MEASUREMENTS

This technology is developing as complete as possible an understanding of the complete [deleted] and how it is generated and radiated. In addition, the submarine as a [deleted] will be examined, and an [deleted] will be developed for future use at SSBN sites.

11. THREAT EVALUATION

Comprehensive threat evaluations based upon review and upgrade of postulated threats will be continued. Threat encounter models and model application to potential threats will be further refined and tailored to an [deleted].

12. HYDRODYNAMICS

Experiments will be conducted to understand the hydrodynamic effects [deleted]. Controlled laboratory experiments will be extended to simulate the effects of [deleted]. Large-scale tank experiments will be conducted with a thermally stratified tank, and at-sea tests will begin to [deleted] as well as other environmental factors which influence potentially [deleted].

13. AT-SEA MEASUREMENTS

The objective of the at-sea measurement program is to understand the natural characteristics of the ocean environment relevant to the [deleted]. The fiscal year 1973 effort includes [deleted] including the [deleted] and the instrumentation and operations of an offshore tower for evaluating sensors and instrumentation for future at-sea tests.

14. [DELETED] SENSORS

Wake sensor measurements will be made to determine the effectiveness of various sensors of [deleted] as could be used in submarine [deleted] systems. The at-sea measurements will serve to quantify [deleted] and also the characteristics of [deleted].

WEAPONRY TECHNOLOGY

Chairman ELLENDER. Please comment on the request of $4.2 million for work to be performed in the field of weaponry technology.

Admiral DAVIES. This item includes a number of related programs intended to help keep the Navy at the forefront of guided missile technology. They include investigations of propulsion [deleted] guidance systems; missile [deleted] configurations designed to minimize shipboard space and weight requirements; [deleted] control systems [deleted] and—perhaps most significantly of all—development of electronics techniques and design approaches to permit reduced missile cost while maintaining high performance.

The programs involve hardware experimentation to assure reality. For example, in the case of propulsion systems, the activities involve the exploratory development of all major engine components—air inlets, combustors, fuels, nozzles, and engine control systems; integration of these components into complete engines; and ground testing to confirm that all components are properly matched to one another.

ADVANCED ANTISHIP WEAPONS—HARPOON

Senator YOUNG. What will be done with the $1.2 million requested for work in advanced antiship weaponry?

Admiral DAVIES. The expenditure of this money by the Applied Physics Laboratory, Johns Hopkins University, will encompass the following efforts:

(*a*) Assist the Navy in monitoring the active seeker design at Texas Instruments.

(*b*) Perform counter-countermeasure testing on the HARPOON seeker.

(c) Provide to the HARPOON test program a highly versatile countermeasure generating piece of equipment.

ADVANCED SURFACE PLATFORMS

Chairman ELLENDER. Please comment on your request for funds for work on Advanced Surface Platforms and tell us why you need the rather large increase you are requesting.

Admiral DAVIES. The Surface Effect Ships Program Office (SESPO) has sponsored the design and construction of two 100-ton craft that employ the surface effect principle to achieve speeds in excess of 80 knots. In parallel with the current sea trials of these two craft, SESPO is expanding the SES program by commencing preliminary design of a 2,000-ton SES prototype escort vessel. Ships of this type offer the potential of revolutionizing naval operations by virtue of their high speed, lessened radar detectability, and lower acoustic emissions. SESPO has requested the Applied Physics Laboratory to define, by analytical and experimental means, the radar cross sections and acoustic signatures of both the 100-ton craft and the proposed 2,000-ton prototype, and to conduct analytical studies to define operational and environmental limits of equipment, weapons, and personnel required for the protoype vessel.

SUBMARINE TACTICAL WARFARE SYSTEMS

Chairman ELLENDER. What is the nature of the work to be performed with funds you are requesting for submarine tactical warfare systems?

Admiral DAVIES. The nature of the work to be performed by Johns Hopkins University Applied Physics Laboratory on submarine tactical warfare systems involves the advanced cruise missile and [deleted]. The new program element for this work is 63357N, cruise missiles (adv).

SURFACE LAUNCHED WEAPONRY, SYSTEMS, AND TECHNOLOGY

Senator YOUNG. What is the nature of the work to be performed with funds you are requesting for the project entitled "Surface Launched Weaponry, Systems, and Technology?"

Admiral DAVIES. Planned effort for the Applied Physics Laboratory of the Johns Hopkins University in support of this element covers four different projects. I will summarize the nature of work planned for each of these projects.

(1) Standard missile SSM.—Technical support for continued development of an interim surface-to-surface missile (ISSM). This project provides for the development of an active seeker and an anti-radiation mode (ARM) capability for use on the standard missile.

(2) Standard missile midcourse guidance.—Continued technical support for development of midcourse guidance for standard missile. This advanced version of the standard missile is required for use with the Aegis weapon system and will provide for increased Terrier and Tartar weapon system performance when it is used with these systems.

(3) SAM antimissile capability.—Continued technical support for development and introduction of shipboard weapon system improvements to present operational Terrier, Tartar, and Talos systems. Electronic counter-countermeasure (ECCM) improvements to fire control radars and missiles are planned. Development of Terrier and Tartar weapon system compatibility modification required for standard missile (SM–2) will be continued. Update of digital weapon systems to improve reaction time is also planned.

(4) Point defense and close-in weapon systems.—A modest level of effort is planned for these systems in the areas of technical performance analyses and related technical support.

PROJECT AEGIS

Chairman ELLENDER. $3 million is requested for Project Aegis. Please comment on this request.

Admiral DAVIES. The Applied Physics Laboratory of the Johns Hopkins University acts as technical adviser and provides a broad background of expertise to the Aegis program manager in the areas of combat weapons systems and ship system integration. This expertise is based on many years of experience in Fleet Air Defense, is contained within a single organizational framework and is not available from any other source. Work is carried out by the Laboratory in response to specific technical assignments which are typically related to evaluation of the engineering development effort conducted by the Aegis prime contractor, integration of the Aegis weapon system with specific ship classes and related weapons, and assistance in the resolution of specific problems as they arise during the course of the program.

General types of questions which the Laboratory explores are:

1. Examination and analysis of test requirements and scheduling to provide assurance that the tests performed are nonredunant and adequate to the needs of the program within costs and schedule constraints imposed in the program plan.

2. Investigation and evaluation of new technologies prior to their incorporation into the system to avoid unwarranted increase in risk of contractor-incurred cost or schedule increases.

Specific assignments at the Laboratory include:

1. Investigations of techniques leading to simplification and reduced cost of the production system without sacrifice of required performance or reliability. These investigations include:

(*a*) Evaluation of a high-powered transmitter switching arrangement which permits a reduction in the number of final amplifiers and power supplies by a factor of 2 without loss of performance, and

(*b*) Evaluation of a low-cost, high reliability solid state power conditioning system which can replace 400-cycle motor-generator sets which currently constitute one of the most failure-prone items in the fleet.

2. Definition and design of a mockup of the Aegis combat system to include a tactical command system and supporting sensor, weapon, and fire control systems. This mockup will provide an operable combat information center instrumented with the necessary simulations and models to determine optimum methods of information transfer and operator response. A primary goal of the mockup will be to assure optimum integration of elements of the combat system for maximum performance and cost effectiveness.

APPLIED PHYSICS LABORATORY, UNIVERSITY OF WASHINGTON

Chairman ELLENDER. $1.1 million is requested for work to be performed by the Applied Physics Laboratory at the University of Washington. The tabulation appearing on page 86 of the justifications will be included in the record at this point.

(The information follows:)

APPLIED PHYSICS LABORATORY, UNIVERSITY OF WASHINGTON

[In thousands of dollars]

	Fiscal year—		
	1971 actual	1972 estimate	1973 estimate
Research, development, test, and evaluation, Navy appropriation:			
11224N—SSBN (ballistic missile submarine nuclear) defense	$50	----	----
25685N—MK 48 torpedo	15	----	----
61151N—Research	----	$15	$15
62753N—Weaponry technology	768	833	868
62754N—Naval vehicle technology	----	110	135
62755N—Support technology	190	105	110
Total	1,023	1,063	1,128
Operations and Maintenance, Navy:			
31022N—Scientific and technical intelligence	----	25	----
78012N—Logistic support activity	529	487	552
Total	529	512	552
Other procurement, Navy:			
24311N—Submarines	80	25	----
25685N—MK 48 torpedo	79	----	----
Total	159	25	----
Total, Applied Physics Laboratory, University of Washington	1,711	1,600	1,680

Chairman ELLENDER. Generally speaking, what is the nature of the work performed by this laboratory?

Admiral DAVIES. Navy programs at the Applied Physics Laboratory, University of Washington, are primarily in the fields of undersea warfare weaponry, ocean physics, and fleet support, including weapon system alinement, accuracy checks, and design cognizance.

Chairman ELLENDER. According to the tabulation, the largest project to be undertaken by the Applied Physics Laboratory for fiscal year 1973 is entitled "Weaponry technology," for which you are requesting $868,000. Describe this project, and tell us if it has any relationship to the project entitled "Weaponry technology" performed by the Applied Physics Laboratory at Johns Hopkins University.

Admiral DAVIES. Yes, sir. This is an exploratory development program in undersea weaponry which includes development of targets for advanced torpedo guidance systems and miniature mobile targets, submarine acoustic reflectivity studies, investigation of the effect of

the oceanic microstructure on torpedo acoustic signals, and investigation of the use of active acoustic lens in acoustic homing torpedoes. These tasks have no relationship to the weaponry technology program at the Applied Physics Laboratory, Johns Hopkins University, which are primarily in the field of missile weaponry.

Senator YOUNG. I note that $552,000 is being requested under the Navy's operation and maintenance appropriation for "Logistic support activity." What is meant by logistic support activity?

Admiral DAVIES. The Applied Physics Laboratory, University of Washington, provides continuing support to the Navy in its sonar calibration and alinement program, and in providing design cognizance for the Mark 45 torpedo. These are fleet support tasks funded by the operations and maintenance, Navy, appropriation.

CENTER FOR NAVAL ANALYSES, UNIVERSITY OF ROCHESTER

Chairman ELLENDER. The tabulation appearing on pages 86 and 87 setting out the source of funding for work to be performed at the Center for Navaal Analyses at the University of Rochester will be included in the record at this point.

(The information follows:)

CENTER FOR NAVAL ANALYSES, UNIVERSITY OF ROCHESTER

	Fiscal year—		
	1971 actual	1972 estimate	1973 estimate
Research, development, test, and evaluation, Navy appropriation:			
31011N—Cryptologic activities	$175	[Deleted]	[Deleted]
65152N—Studies and analyses support, Navy	60		
65153M—Center for naval analyses, Marine Corps	897	$700	$850
65154N—Center for naval analyses, Navy	6,565	6,500	6,800
65853N—Management and technical support		1,350	1,400
Total	7,697	[Deleted]	[Deleted]
Operations and maintennace, Navy:			
31022N—Naval intelligence		[Deleted]	[Deleted]
31113N—Professional training		22	271
33113N—Naval communications		300	295
Total		[Deleted]	[Deleted]
Total, Center for Naval Analyses, University of Rochester	7,697	9,310	9,776

Chairman ELLENDER. The Navy operation and maintenance request includes $626,000 for work to be performed by the Center for Naval Analyses. [Deleted] is requested for naval intelligence, $271,000 for professional training, and $295,000 is for naval communications. Would you please provide a statement for the record on the nature of the work to be performed with these O. & M. funds.

Dr. FROSCH. Yes, sir. I should point out there is a printing error in the budget justification and I am showing the correct figures in the text.

Naval intelligence program ..... [Deleted]

The Center for Naval Analyses conducts a program of operations analysis in support of the Director of Naval Intelligence. The majority of the program is devoted to analysis of Soviet Naval Operations.

By 1973 emphasis would shift from anti-shipping and anti-task force tactics to Soviet submarine and submarine ASW operations. Operationally (as distinct

from technologically) based estimates of the effectiveness of Soviet systems and tactics would be prepared. Special attention would be devoted to Soviet surveillance operations and effectiveness.

Naval communications program $271,000

We propose to continue through CNA a dedicated communications analysis effort in support of the Naval Communications at the level of approximately 5 professional staff members.

The principal project here would involve the integration of the recently approved Navy tactical satellite communications capability into fleet communications. This work would deal with the most suitable ways of allocating communications channels to functions, and traffic to channels in the post-satellite complex that includes major non-satellite elements. Tactical voice communications and the interaction between long-haul and local area communications would be studied. Shipboard procedural problems and performance would also be examined.

Naval War College $25,000

As part of its field support activities, CNA assigns one analyst to the staff of the Naval War College. The expert operational guidance provided by the representative has been invaluable in the conduct of the resident courses.

ORDNANCE RESEARCH LABORATORY, PENNSYLVANIA STATE UNIVERSITY

Chairman ELLENDER. $6.3 million is requested for work to be performed by the Ordnance Research Laboratory at Pennsylvania State University. The tabulation appearing on page 87 of the justifications setting out the source of funding for this laboratory will be included in record at this point.

(The information follows:)

ORDNANCE RESEARCH LABORATORY, PENNSYLVANIA STATE UNIVERSITY

		Fiscal year 1971 actual	Fiscal year 1972 estimate	Fiscal year 1973 estimate
Research, development, test, and evaluation, Navy appropriation:				
25685N	MK 48 torpedo	$2,230	$958	$915
61151N	Research	565	660	685
62751N	Target surveillance technology	100	110	160
62753N	Weaponry technology	2,673	2,340	2,895
62754N	Naval vehicle technology	235	320	280
62755N	Support technology	205	180	200
63655N	Mine development (advanced)		950	1,100
64562N	Submarine tactical warfare systems (engineering)	55		
65853N	Management and technical support		65	65
	Total research, development, test, and evaluation, Navy appropriation	6,063	5,583	6,300
Other procurement, Navy:				
24614N	Mines and mines support	50		
25685N	MK 48 torpedo	500	417	
	Total other procurement, Navy	550	417	
	Total Ordnance Research Laboratory, Pennsylvania State University	6,613	6,000	6,300

Chairman ELLENDER. Please comment on the need for the increase of $300,000 you are requesting for fiscal year 1973.

Admiral DAVIES. Yes, sir. The undersea weaponry exploratory development effort at the Ordnance Research Laboratory requires some increases to support investigations in undersea acoustics and signal processing. Research in prior years has been sufficiently promising that these programs should be expanded to allow construction of hardware and testing at sea. There are also increased funding requirements for the [deleted] project as the technical direction effort is increased to

encompass functional testing and data reduction, establishment of design parameters and supporting programs.

Senator YOUNG. Comment on any relationship between the project "weaponry technology" for which you are requesting $2.9 million and the two other projects entitled "weaponry technology" on which the Applied Physics Laboratory at Johns Hopkins and the University of Washington are working.

Admiral DAVIES. Yes, sir. The weaponry technology tasks at the Ordnance Research Laboratory are primarily in the undersea technology fields of propulsion, acoustics countermeasures protection, transducers, noise reduction, and fluid dynamics. Although the APL, University of Washington effort is also primarily in the undersea area, the tasks assigned each are such that the results complement rather than duplicate effort. Individual results from each laboratory are made available to other laboratories working on projects in the undersea area.

The APL/Johns Hopkins University Weaponry Technology program is not related since it is primarily in the field of missile weaponry.

AEROSPACE CORPORATION

Chairman ELLENDER. The tabulation appearing on page 88 of the justifications, setting out the source of funding for work to be performed by the Aerospace Corporation will be included in the record at this point.

(The information follows:)

AEROSPACE CORP.

		Fiscal year 1971 actual	Fiscal year 1972 estimate	Fiscal year 1973 estimate
Research, development, test, and evaluation, Navy appropriation:				
33109N	Satellite communications		[deleted]	[deleted]
62752N	Command and control technology		$185	$65
62755N	Support technology		170	95
63451N	Space technology		[deleted]	[deleted]
Total research, development, test, and evaluation, Navy appropriation			820	860
Total aerospace Corp			820	860

Chairman ELLENDER. Would you please comment on the nature of the work to be performed with these funds?

Admiral DAVIES. Funds in the command and control technology and the support technology programs for fiscal years 1972 and 1973 cover work associated with prelaunch support, orbital support, and data analysis pertaining to a sublow frequency antenna instrumentation package for a planned SESP (space experiment support program) flight. Funds in the space technology program for each fiscal year covers personnel and other direct costs pertaining to general systems engineering space technology efforts on the "white cloud" program. This program provides technical support to the Navy space project and is utilized for quick-reaction engineering studies and analyses required incidental to program planning and evaluation.

LINCOLN LABORATORIES, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Chairman ELLENDER. The request for this appropriation includes [deleted] for work to be performed by the Lincoln Laboratories, Massachusetts Institute of Technology. These funds are for the program entitled "Fleet Ballistic Missile Command and Control." Please comment on the nature of the work to be performed with these funds.

Admiral DAVIES. The Fleet Ballistic Missile Command and Control under the Special Communications (SPECOM) Project Office was established with the primary mission to provide increased command and control communications capability for strategic forces, particularly the FBM Force. The Project Office includes many diverse communications projects that support this mission. These projects are in various stages of research and development and/or acquisition. Because of the wide range of R. & D. activities involved in these many projects, it is necessary that the Project Office have technical assistance not only for independent research activities, but for critique and evaluation of other related technical efforts by laboratories, contractors, and consultants. In 1967, the Defense Science Board recognized that a matched civilian systems definition and technical support team should be employed by the Navy in its strategic communications program and specifically recommended MIT Lincoln Laboratory be considered.

The mission of the Lincoln Laboratory is to carry out a program of R. & D. pertinent to major defense problems with particular emphasis on advanced electronic technology. This centralized R. & D. capability in the strategic communications area provide a very effective method of assisting the project manager in carrying out his primary mission. The major projects in the FBM Command and Control evolve through the various cycles of R. & D. with many changes in particular areas of expertise required such that in-house resources are not always available, may not be the most effective for the role, and do not provide independent analysis. Lincoln Laboratories' broad laboratory experience and involvement in many DOD electronic and communications projects provide a basis of obtaining rapid technical advice and consultant services as required. These services are often used in evaluating the efforts and products of other contractors and specialized laboratories. In addition, because of the interrelationship of the technology in many DOD communications projects, it is most efficient and effective to utilize Lincoln Laboratory services in certain technical areas as a primary R. & D. input to the Project Office.

Currently, Lincoln Laboratories is performing work on the following projects for the FMB Command and Control project:

Sanguine.—Continue communications design consultation; H-field antenna development; noise quieting on hull antenna development; receiver design and simulation; and ELF propagation studies.

Network analysis.—Support analysis and new techniques.

Hydrus.—[Deleted.]

ISCS.—System engineering support; combined buoyant cable antenna.

Work will be performed with funds requested on the following projects in fiscal year 1973:

Sanguine.—Continue communications design consultation; H-field antenna development; noise quieting on hull antenna development; receiver design and simulation; and ELF propagation studies.

Network analysis.—Continue support analysis and new techniques.
Supporting research.—B-adv support application.
Hydrus.—Continue [deleted].
ISCS.—Combined buoyant cable antenna.

Questions by Senator Thurmond

Chairman Ellender. Senator Thurmond was unable to be here today, but has asked that responses to questions he has supplied will be answered for the record. The questions and answers will appear at this point in the record.

(The information follows:)

Questions by Senator Thurmond

ULMS system readiness

Senator Thurmond. Mr. Secretary, what advantage from the standpoint of system readiness will be accomplished by starting ULMS in fiscal year 1973?

Dr. Frosch. Since the ULMS program has been under development for several years, I assume that you are referring to the decision to accelerate the ULMS development. This program will lead to deployment of the first ULMS submarine in 1978, at least 2 to 3 years earlier than would have been the case in the regular program. This alternative was chosen over all the alternatives for new strategic initiatives since the at-sea portion of our sea-based strategic forces has the best long-term prospect for high prelaunch survivability in the face of a growing Soviet threat. The system readiness of the ULMS submarines will be measurably better because newer technology allows them to be designed and built with improved maintenance capabilities and higher equipment reliability. This permits a quicker turnaround time and longer intervals between ship overhauls, thereby increasing the overall utilization or readiness of our sea-based strategic force.

Senator Thurmond. Secretary Frosch, it has been stated outside of this committee that the ULMS timetable could be met even if the program were not initiated until next year. Would you comment on this point?

Dr. Frosch. If the fiscal year 1972 supplemental funds were not approved and the IOC of the ULMS timetable were not changed, the technical risks on some of the subsystems that comprise ULMS would increase. While fallback positions exists, employing equipments of older technology would degrade the characteristics and performance of ULMS. It is probable that system degradation would not be acceptable and the program would be delayed for as much as [deleted] months.

(Additional classified material has been furnished separately to the committee.)

Risks in ULMS acceleration

Senator Thurmond. What technical risks will the Navy accept by accelerating this program?

Dr. Frosch. The date for the IOC of ULMS was established as the earliest practicable date achievable by an orderly low risk program. No significant technical risks exist provided the additional planned effort is funded as requested in fiscal year 1972 DOD supplemental budget request.

Senator Thurmond. If the $35 million supplemental is refused, does the Navy plan to add that sum to its budget request?

Dr. Frosch. The Navy plans to add the $35 million to the fiscal year 1973 budget request if the fiscal year 1972 supplemental budget is refused. This money would be applied to submarine contract design, and to procure prototype submarine equipments for test and evaluation for which specifications and documentation have been developed and for which procurements in fiscal year 1972 have been planned. The total is approximately [deleted] million. The remainder would be applied to development of system integrated logistics support planning, refit site support and system survivability trade-off studies previously planned as fiscal year 1972 efforts.

INCLUSION OF MISSILE COST

Senator THURMOND. Mr. Secretary, I support ULMS this year for a number of reasons. Much is being said about the cost of this program. Is it customary to include the cost of the missiles in the SLBM boat costs?

Dr. FROSCH. No, development of missile, submarine, and supporting systems are funded in R. & D. Procurement of missiles for the SLBM are funded in PAMN. The submarine including the weapon support system (i.e., fire control, navigation, and launcher equipments) are funded under SCN. Missile, submarine, and supporting systems are counted for total systems costs which include most all appropriations.

EFFECT OF NONAPPROPRIATION FOR ULMS

Senator THURMOND. Since R. & D. of over $100 million was in the fiscal year 1972 request, what woud be the impact if the fiscal year 1973 funds were refused?

Dr. FROSCH. Approximately $165 million has been committed to the program in fiscal year 1972 and prior years. Nonapproval of fiscal year 1973 funds would mean stopping the program, and those teams, both in industry and at Government facilities, would be disbanded. Essentially all development work underway would be disrupted. Should the program be restarted in fiscal year 1974 or later years, a considerable amount of rework would be required at additional start up costs and program delays.

ULMS MILITARY CONSTRUCTION FUNDS

Senator THURMOND. Identify, for the record, the uses that the $27 million in military construction for ULMS will be put to during fiscal year 1973.

Dr. FROSCH. MILCON funds in fiscal year 1973 will be used for the architectural and engineering planning required for the components for the refit facility. Efforts to be accomplished include real estate acquisition and easements, and site preparation. Depending on the site selected, dredging and access roads will be required. The above will account for approximately [deleted] million. The remaining [deleted] will be spent for preliminary site planning and construction estimates for fiscal year 1974.

MARK–48 TORPEDO TECHNICAL PROBLEMS

Senator THURMOND. What technical problems remain on the Mark–48 torpedo?

Dr. FROSCH. Technical problems remaining on the Mark–48 torpedo involve reduction of self and radiation noise. Specifically, we must [deleted] through the development of an [deleted]. Technical problems were identified during Operational Evaluation (Opeval) in the fuel control system, causing premature shutdown or failure to start and the use of inadequate procedures for preparing torpedoes for test firing. The operational evaluation problems have been corrected.

TORPEDO TARGETS

Senator THURMOND. Explain the reprograming request for 25 Mark–30 torpedo targets versus the 11 Mark–27 targets.

Dr. FROSCH. The Navy, in conjunction with OSD, has been taking a very close look at the ASW target situation in order to minimize long-range support costs. Specifically, it has been working on the best way to merge the projected use of a target initially developed to meet the speed and depth requirements for exercising the MK–48 torpedo with our plans for a universal, multipurpose unit which would simulate a submarine for a whole family of ASW weapons and sensors.

The January 1971 plan for buying 10 MK–27 targets for use with the MK–48 torpedo only and 11 MK–30 targets for exercising other systems was modified late in 1971 to provide for fiscal year 1972 procurement of 25 MK–30 improved targets capable of exercising both the MK–48 and other systems. Realinement of nonrecurring cost requirements plus some economies of scale permitted the increase from 11 to 25 with an increment of only $2 million to the initially programed amount. The increase of a total of four units still does not supply the total Navy need for a substitute for expensive, "live" submarine target services. However, 25 units is an adequate number for the initial production buy of the improved target, which opens the way to a gradual phaseout of previously procured nonuniversal targets, confining support costs to one type.

STATEMENT OF HON. ROBERT A. FROSCH, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH AND DEVELOPMENT

Chairman ELLENDER. Also at this point there will appear the complete statement of Assistant Secretary of the Navy Frosch.

(The statement follows:)

I

INTRODUCTION

Mr. Chairman, Members of the Committee:

It is a privilege to appear again before this Committee to present to you the FY 1973 program and budget for Research, Development, Test and Evaluation, Navy.

With me today are my principal assistants in the management of the day-to-day business of Navy R&D. VADM Weymouth has relieved RADM Ruckner as Director, Research, Development, Test and Evaluation since our last meeting. RADM Davies, Chief of Naval Development and Deputy Chief of Naval Material (Development), RADM Holmquist, Chief of Naval Research, and BGEN Brooks, Deputy Chief of Staff (Research, Development and Studies), USMC, have all appeared before you with me in previous years.

In addition to the Program Element and fiscal display backup books, we have delivered to the Committee a statement containing as appendices more voluminous and detailed information concerning fiscal analyses and a detailed Program Review by budget activity. I offer this to you for such use as you may wish to make of it. The initial portion of this statement amounts to a blue-lined version of the whole, rearranged and rewritten to emphasize the general factors and views which tie the various aspects of the program together. I propose to use this portion of the written statement as the basis for my oral presentation today. It should take about an hour if read continuously. Naturally, in this brief formal presentation, almost all detail must be omitted; these details are in the appendix portion of the written statement and in the backup books, and I shall rely on your questions as an opportunity

to guide me in bringing out those points which will be of most interest to you in the discussion. I expect that points I make in this presentation will suggest to you areas for more detailed exploration in our discussions. I will welcome questions from the Committee at any time during my presentation.

II

OVERVIEW

The Navy, including the USMC, is requesting New Obligational Authority amounting to $2.73 billion for FY 1973 RDT&E programs. A summary of this program by Budget Activity along with program details will be found in the Appendices to this statement.

As you know, the Navy today is undergoing its most dynamic change since the introduction of modern aviation. I will attempt to highlight what the R&D program is doing to help bring about the CNO's "Navy of the Future". I will discuss where we are going, some of the new things we have done, a few important successes - and a disappointment or two as well - actions we have taken or intend to take, conclusions we have drawn and some of the business aspects of managing R&D.

In recent months, we have again taken careful stock of our naval capability vis-a-vis potential antagonists, particularly as related to relative technological investment. Our Navy is facing a host of new operational challenges that result in large part from a major reorientation of the Soviet Union's tactical and strategic capabilities. Russia has made continuing progress in quiet submarines, improved aircraft, and surface, subsurface and air-launched missiles, combined with new tactics to exploit these developments vigorously, and is challenging the Navy in ways entirely new since the end of World War II.

These problems are further compounded by the introduction of capable anti-ship weapons into other navies.

We must meet these new and increasing threats through a broad spectrum of actions, prime among which is the strengthening of our technology base, and thus our ability to respond to threats.

Our new Navy is being built from a base of sophisticated technologies, a base that is crucially dependent upon research. Research supplies new ideas which become candidates for development of weapons and equipment to solve operational problems. Research provides the solution to scientific problems and allows the rapid application of emerging technologies to support naval missions and functions. Research provides a base of understanding which can be drawn upon to solve completely new and previously unexpected problems. Admittedly, it is difficult to predict far in advance the precise relationship between specific research and technology development. However, we do have a sense of technological trend which, combined with the challenges facing the New Navy, give us a firm feeling for the kinds of risk-taking research ventures which are liable to pay off.

We know, for example, that the Navy of the Future must have access to more of the electromagnetic spectrum than it uses today. The need for specialized communications, often across the air/sea boundary; countermeasures; and a broad range of detection, tracking and surveillance requirements all point to the importance of having new equipment to operate in these new parts of the spectrum.

Materials research will make new technologies available for naval applications and will improve existing systems. There will be ultra-strong ceramics for sonar applications and new materials for smaller, more powerful propulsion and energy conversion systems. Improved materials for jet engines will be particularly important for the future of vertical takeoff and landing aircraft for the Sea Control Ship and USMC Close Support Aircraft.

Research in the terrestrial and atmospheric sciences and oceanography will provide the New Navy and the Marine Corps with essential information about the expanding operating environment. More and more, the success of technologies which utilize new parts of the spectrum and which depend upon low power phenomena, typically against a noisy background, depend upon a more detailed understanding of the environment, from the bottom of the ocean to outer space.

The Navy Exploratory Development Program is the R&D category into which new knowledge is reduced to practical technology. Exploratory Development operates in two time frames: First, in the short range where we directly apply our new technology to critical systems proposed for operational use; and second is the long term, where we test the feasibility of components that are destined to be parts of the major weapon systems of the future. In a well coordinated research and development program, these new technologies - new ways of doing things - enable us to by-pass many of the blind alley that might otherwise be encountered in attaining a new weapon system.

As an example, programs in high temperature materials and composite structures should open new vistas for re-entry vehicle capabilities, and may, in some cases, lower the cost

of structures in aircraft. These represent positive thrusts toward exploring problems of significant importance to the New Navy and Marine Corps.

In communications and navigation, our programs recognize the need to operate without uncontrolled exposure to the enemy. We continue to explore communications in all environments and new techniques for determining the precise location of enemy forces, as well as our own. Technology contrives to present new areas for exploitation and we pursue them vigorously as they occur.

While these Exploratory Development programs, taken one at a time, may not individually appear significant, taken in sum, they form a base without which the Navy (new or old) simply could not continue to operate effectively.

Within the naval forces of the future, Surface Effect Ships may provide the means to move ASW sensors and weapon launchers at vastly increased speeds as well as transport large numbers of men and quantities of material and supplies. Air Cushion Amphibious Assault Landing Craft and major caliber lightweight guns will provide superior over-the-beach capabilities, shore bombardment, and ship-to-shore support. Our development of Active and Anti-Radiation Missiles and Electronic Warfare Decoy and Jamming Systems will give our surface ships both a lethal tactical offensive and a threat reactive defensive capability. V/STOL aircraft and LAMPS will add a new air capability dimension to the smaller units of our operational forces. Improvements in detection devices and submarine-launched missiles will increase both our offensive and defensive posture in ASW and undersea warfare. Our efforts in space will be of benefit to all our units - air, surface and subsurface - and the ULMS

program and improvements in strategic communications will assure the Navy's continued effective contribution to the Nation's strategic deterrent capability.

Several new and innovative procedures have been instituted in Navy R&D management. Following SECDEF guidance concerning the acquisition of major weapon systems, we are starting to make more extensive use of Advanced Prototyping in the development process. In response to Congressional invitation, we have requested authority to reprogram $10M in FY 1972 to permit initiating these prototype efforts. Our FY 1973 proposed budget includes follow-on funds to these beginnings. I am hopeful that this approach will produce a wider variety of new program capability options prior to formal commitment to development. The idea, as you know, is that we stimulate the ingenuity of industry and our Government teams to develop new, better, faster and cheaper hardware solutions to military problems.

A second initiative is the emphasis being placed on Testing and Evaluation prior to committing ourselves to major production. In recent years, we have obviously over-estimated our ability to predict and solve all our problems and depended too often on paper studies for the solution. The new emphasis on early testing is working its way into all development projects. An early effort to ascertain where we stood and what changes were needed resulted in identification of a requirement to reallocate some $11M of previously planned FY 1973 funds within projects to enable us to demonstrate properly the projects' maturity prior to moving into production.

This emphasis on test and evaluation will undoubtedly add some additional time and dollars into the development process. The payoff should be significant in terms of reliability, maintainability achieved, and the reduction of fixes so often

required following too rapid an introduction into service use. In these senses, the loss of time and dollars in development should be repaid amply in savings of time and dollars in fleet introduction and maintenance.

In a related initiative, efforts were undertaken in FY1972 to establish an RDT&E project to improve the reliability of certain weapon systems and equipment. This RDT&E investment is designed to reduce O&M costs downstream. The effort was initiated to study operational (or very soon to be operational) systems in order to determine those critical components having a potential for significant life cycle cost saving.

The Low Cost EW Suite initiative is designed to exploit the notion that we should design to a price and determine the performance which can result.

Another area in which initiative is being exerted is in R&D support of personnel and training. I would like to mention the nature of this program and the benefits to be derived therefrom.

In the context of the overall DOD budget, approximately $1.00 is spent in the general area of manpower research for every $1,000 of payroll, compared to a smaller ratio for hardware R&D versus procurement.

There is a payoff in terms of dollars. For example, by using specially developed aptitude scales in selections for officer training and enlisted scientific education programs, the Navy is saving at least $3M per year through fewer dropouts and increased retention. Computerized matching of Navy recruits with job and school assignment reduces training costs by more than $1.5M annually. Restructuring of Navy entry level aviation mechanics and avionics training is saving at least $2.5M a year.

I have noted that some significant strides were taken in the past year. We also had our share of disappointments. For example, we have experienced delays in the testing of the 100-ton testcraft under the Surface Effect Ships program. These ships were to begin testing last summer. We have, we believe, overcome the obstacles. In one case, transmission qualification test failures and related engineering problems, and in the other case, contractor program control, staffing and management difficulties prevented our proceeding on schedule. We now expect to commence the tests of the Bell craft in February 1972 and the Aerojet testcraft in the spring of this year. In spite of these disappointments which have caused a slippage in the program of about nine months, we have undiminished confidence in the ultimate utility of the SES. These ships with their expected greater-than-80-knot-speed capability and their virtually unlimited size potential could provide the Navy with a breakthrough comparable in significance to the transition from sail to steam. The high speed and low vulnerability to undersea attack will qualify the SES for the ASW mission and the escort role. The potentially large size, coupled with the high speed also makes for an ideal logistics vehicle.

Since last year, we have conducted competitive tests on the MK 48 Torpedo and selected the Clevite Corporation version. When we began the Operational Evaluation, we experienced some reliability problems, such that we were forced to suspend the OPEVAL to investigate them. The problems turned out to be related to the transition from contractor preparation of weapons to their handling by sailors. We learned much about the crew handling and training necessary to derive the latent capability from the weapon. These problems have now been overcome and the

OPEVAL is proceeding. We still have some problems in automatic test equipment for this weapon and continuing concern with configuration control, but detailed management attention is yielding results. The development of this sophisticated weapon system has taken longer and cost overall considerably more than we had hoped. As we approach completion of development, however, the performance achieved appears to justify our perseverance.

III

REVIEW OF R&D PROGRAMS BY WARFARE AREA

The individual research and development programs can best be described in terms of the warfare areas they support. Programs I will now discuss have been selected from our total effort because of their importance to our objectives. Additional details on them and on the other programs have been provided in the Supporting Data Books.

AIR WARFARE

The significant Air Warfare programs can be grouped roughly into two parts - those new projects which are directed toward maturing the Sea Control concept of the future and those ongoing programs which are nearing completion and fleet introduction.

In the Sea Control Ship area, we have designated the USS GUAM as an interim test platform. We will use this platform to study operational concepts and tactics such that we can focus our developments on confirmed requirements. Tests are underway in the USMC to validate the HARRIER through intensive operations at sea, as well as from shore sites.

I would like to emphasize the increasing extent to which we are using experimental hardware, new mixtures of existing operational vehicles and hardware, and tactical experiments in

the fleet to learn lessons on the real tactical value of new concepts. These lessons will guide us in establishing more realistic military requirements and in knowing better what to develop. We are strengthening the partnership between the operators and the developers through continued at-sea experiments.

We are mid-stream in the process of refining our V/STOL Advanced Prototype program. Two types of aircraft are being addressed - a long endurance sensor carrier which may also deliver weapons against low resistance targets such as surfaced submarines and fast patrol boats, and a shorter endurance, higher performance fighter attack type for air opposition and offensive missions against larger ships and shore targets.

The F-14A program has made major strides since I last reported to you. For example, eight aircraft are now in flying status and the PHOENIX Weapon System is being installed in an F-14 (#4) at the Naval Missile Center, Point Mugu, California. We have just completed a Navy Preliminary Evaluation (NPE) with the following results: During the two-week period of Phase I, we accomplished 39 flights and some 74 hours of flight time using Navy pilots. This is a substantial achievement in terms of our prior experience with other aircraft developments at the equivalent time in their development. One F-14A achieved four flights in one day. No substantial flight problems were uncovered; however, some deficiencies were noted, all correctable.

Early problems with the F-401 Engine development have been such that the first flight of the F-14 equipped with this engine has been deferred and is now estimated for April 1973.

Testing of the PHOENIX and associated missile control system (AWG-9) is continuing at the Naval Missile Center, Point Mugu. The Navy Technical Evaluation (NTE) with the F-14 integrated system in aircraft #4 is scheduled to begin this spring. The success rate for PHOENIX firings is quite satisfactory.

The AGILE Missile advanced development under the management of the Naval Weapons Center, China Lake, is progressing in a satisfactory manner. Ballistic Test Vehicle shots were completed in August 1971.

In the air-to-surface weapons field, our development program for the common air-launched and surface-launched HARPOON Anti-Ship Missile System is presently in the two-year Engineering Design Phase which began on 21 June 1971 with the award of a contract to the McDonnell-Douglas Aircraft Corporation. The two competing Gas Turbine Propulsion Systems are in hand with successful first tests.

The CONDOR development effort has made considerable progress during the past year with the contractor demonstration flights successfully completed in August. Test objectives were fully demonstrated. This system has now demonstrated hits against simulated SAM sites, ships and a revetted radar installation. We plan next to conduct Technical and "Quasi OPEVAL" using Navy personnel. The cost-constrained version of the full capability will give us a further parameter to evaluate in terms of military capability.

The TRAM (Target Recognition Attack Multisensor) program of integrated sensors is planned for introduction into the A-6E and A-7E aircraft following extensive tests in the Mediterranean with the SIXTH Fleet which used A-6 aircraft fitted with prototype equipment.

SURFACE WARFARE

Much of the future surface Navy will be the result of modern developments such as 170-ton hydrofoil ships based on proven designs and carrying surface-to-surface guided missiles such as HARPOON. It is expected that procurement of these ships will begin in FY 1973 using SCN funds. Sixty-ton hydrofoils have been tested in Southeast Asia; and one, the TUCUMCARI (PGH-2), made a six-month European deployment to demonstrate to our NATO allies the naval capabilities of hydrofoils. We are looking to the day when we can build and operate hydrofoil ships in sizes up to several hundred tons.

In the Amphibious Warfare area, we are developing high speed assault landing craft. As I reported last year, contracts have been let to provide prototypes of these air cushion vehicles which will be fully amphibious and capable of speeds in excess of 50 knots. Construction of these prototypes is underway. They will have a roll-on-, roll-off-the-ship capability and be able to carry 60 tons of men, equipment and cargo ashore.

We have several Interim Anti-Ship Missile programs underway to provide the fleet quickly with a better surface-to-surface missile capability. During FY 1972 we will have equipped 6 DDs and 2 PGs with the semi-active Standard missiles and during this fiscal year we will equip additional combatants and provide a Standard ARM capability as well. We have a further developmental effort underway for Standard; and, if tests this fall confirm the performance, we may deploy some of these units until the HARPOON missile becomes available in the mid 1970s.

The High Energy Laser program which I discussed last year is making progress. The technical work is under the guidance of the Naval Ordnance and Naval Research Laboratories for the Naval Ordnance Systems Command.

The AEGIS program has made good progress and our technical effort appears ready to justify the belief that a system of greatly reduced cost and size is realizable.

In order to provide the fleet with a capable sensor to detect the attacking anti-ship missile, we initiated in October 1971 the development of a family of Target Acquisition Systems. The most capable system, a dual mode sensor, will be installed on board ships with the NATO SEASPARROW system in the mid 1970s to form an Improved Point Defense Surface Missile System.

The "VULCAN/PHALANX" Close-in Weapon System has continued to achieve impressive results in developmental tests. The new penetrator projectile, being developed as part of the system, has been successfully demonstrated. The overall program is proceeding against a set of objective achievement milestones. We expect to show that we can accelerate the schedule through extensive development and operational testing that will prove the success of the development earlier than originally planned.

The SHORTSTOP modular EW system, intended for reasons of weight and cost for installation only aboard some aircraft carriers and other high value ships, has the capability to monitor the electromagnetic environment and thus recognize and display in tactical sequence the events of a surface ship engagement.

Completion of technical and operational evaluation of the SHORTSTOP installed aboard USS BIDDLE is scheduled this year. On the basis of the tests completed to date, we have full reason to expect that the concept will be validated. For small ships where cost, size and weight constraints are even tighter, we propose a "Low Cost EW Suite" new initiative for FY 1973. This project will be carefully defined to be a fiscally con-

strained development with a fully installed production cost goal. Cost targets will be examined in terms of the tactical options afforded.

Before I leave the Surface Warfare area, I would like to address our activities in the prevention and control of environmental pollution. We are working on technological means that ultimately could allow us to eliminate the overboard discharge of all types of ship waste including sewage, garbage, trash, etc. Contracts have been let to solve the most vexing of the waste problems, that of shipboard sewage treatment. There are three 500-man treatment units installed in a ship undergoing evaluation. We are investigating integrated waste management systems as a long term solution to the waste problem. Currently under development are oil/water separators for shipboard use, and techniques to thicken oil films to facilitate oil removal will be investigated. We will be making efforts to reclaim or reuse large quantities of explosives which are a by-product of the manufacture or rework of ammunition.

ANTISUBMARINE WARFARE

The ASW R&D effort in large part is devoted to development of sensors, fixed and mobile surveillance systems, aircraft dropped and monitored systems, and submarine and surface ship sonars.

The surveillance programs account for half the FY 1973 funds allocated to ASW sensors. There will be a continuation of improvements to our installed systems and further effort in the mobile ASW Surveillance Program.

Design approval testing of the Directional Command Activitated Sonobuoy System (DICASS) will be completed in FY 1973 and increased effort will be expended for improved acoustic search sensors which provide high data rate, wider band, and increased channel capacity for acoustic information from multi-sensor arrays and fields.

In FY 1973 the U.S. will begin to participate in a Joint U.S./French effort. This is in addition to our ongoing work with the British in the US/UK Sonar Project.

The BQS-13 DNA submarine sonar project will continue in FY 1973.

In the weapons area, the MK-48 Torpedo Program will be nearing completion of development and will be entering the fleet in increasing numbers. I have already mentioned some of our OPEVAL problems with this program. The relatively small RDT&E effort in FY 1973 has been programmed to complete those requirements associated with fleet introduction.

Proposals in response to our competitive Request for Proposal for a CAPTOR prime contractor are being evaluated. The contractor will work under the direction of the Naval Ordnance Laboratory, White Oak, Maryland.

Of our two major ASW vehicle programs, the carrier-based ASW aircraft, the S-3A, the first flight of which was on 21 January of this year, is nearing completion of development. FY 1973 will see the first full system flight (including avionics). We will also have completed an evaluation of flying qualities and performance of the S-3A and assessment of flying test bed avionics in preparation for our exercise of the Lot IV production option prior to 1 February 1973.

In the Destroyer/Helo System (LAMPS), development of the MK-3 integrated helo and ship baseline suites will continue and a TECHEVAL for the system will commence. Extensive ground and flight evaluation will be performed on all equipment prior to incorporating it into a total system for TECHEVAL. TECHEVAL will be conducted with a shipboard mockup and a test bed helicopter to evaluate the performance of the shipboard and helicopter avionics operating as an integrated system. At-sea tests will evaluate a helicopter securing device needed for operations in rough weather.

We have an extensive at-sea operational program underway employing essentially "off-the-shelf" equipment. These

modifications of the existing KAMAN SH-2D helicopters are designated the MK-1 and MK-2 LAMPS. The MK-1 LAMPS is operable from DE, DEG, DD and DLGN type ships. Extensive tests aboard the USS FOX of the MK-2 LAMPS have been carried out. We are learning about special fleet problems through operational exercises in the Mediterranean using the MK-1 version.

UNDERSEA WARFARE

Undersea Warfare research and development in FY 1973 has two main thrusts - development of non-ASW weapons (mines and submerged launched weapons) and the development of improved sensor equipments for use by submarines.

In the mine warfare area, development will continue on the Advanced Airborne Mine C/M equipment program and the QUICKSTRIKE Mine.

SPACE PROGRAM

As part of the Navy Space Program, we plan to provide more rapid ways of gathering information over broad areas of the earth by satellite. In this regard, a portion of the Navy's R&D space surveillance dollars is being redirected toward evaluations of combinations of sensors and systems by which commanders at sea can be adequately provided surveillance information. The test part of this program will be implemented through an expansion of the traditional mission of COMOPTEVFOR (Commander, Operational Test and Evaluation Forces). First experiments with this concept have already been carried out in the fleet.

Implementation of the Fleet Satellite Communications System entails the development, procurement and launch of synchronous channelized satellites, outfitting all ships with fleet broadcast receivers, and procurement of transceivers for

shore stations, selected surface ships and nuclear submarines. Existing equipment is being modified for installation in the P-3C, S-3A and TACAMO programs. The Navy continues work on an advanced shipboard terminal for use in the Defense Satellite Communications System (DSCS).

The Navy is continuing its efforts on future TRANSIT satellites to improve the precision navigation fixes for our SSBNs. TRANSIT is currently operational with five satellites in orbit and is maintained in an operational status for selected users until such time as an advanced navigation satellite system may be developed within the Department of Defense.

The problem of how best to provide precise position fixing information continuously on a worldwide basis and simultaneously derive altitude information for aircraft users is being investigated in a series of satellite experiments. This technology effort with time navigation (hence the name TIMATION) has progressed well thus far. The Naval Research Laboratory experimental satellites - TIMATION I and II - have demonstrated the feasibility of the principle involved and given experimental indication of the ultimate accuracies that are potentially obtainable. To continue this experimentation, the Naval Research Laboratory will fabricate a research satellite, TIMATION III.

STRATEGIC

In order to insure the continuing survivability of the Navy's submarine based missile force against a broad spectrum of potential future threats, the Undersea Long Range Missile System (ULMS) was conceived. The FY 1973 program continues and expands the effort started in FY 1972 and is aimed at a new force intended to supplement the existing POLARIS and POSEIDON force as necessary and act as an eventual replacement for the current SSBNs sometime in the future. The current

program is a time-phased development which will give us a retrofit capability with the ULMS-1 missile into the POSEIDON submarines, if needed, while on a longer time schedule developing the advanced technology for an even longer range and more capable missile, the ULMS-2.

Continual operational research and development is being conducted to improve and update the technology inherent in the present FBM System. Included in the program planned for FY 1973 is work in the FBM sonar improvement program. We will also continue efforts which are oriented toward the technological updating of the POLARIS/POSEIDON Weapon, Fire Control and Navigation Subsystem to improve accuracy and targeting procedures.

Similarly, the SSBN Defense Program is concerned with understanding the degree of overall submarine system vulnerability to detection, tracking and mission impairment and with improvement to offset any Soviet gains. A theoretical and experimental assessment is underway.

The program for improvements of FBM System Command and Control communications will continue in FY 1973. Among other efforts, we are vigorously pursuing studies of environmental aspects of the SANGUINE system. Other communication system improvements include the TACAMO IV B performance evaluation and the Integrated Submarine System development of an improved FBM/ULMS radio room and submarine antenna.

NUCLEAR PROPULSION

The new NIMITZ Class CVANs will be powered with a dual reactor nuclear propulsion plant; the reactor will be the largest yet developed for naval nuclear propulsion. The very large components in this plant have required a significant extension of technology in areas such as materials, fluid systems and

One of the submarine propulsion plant development projects is the plant for the new SSN 688 class for which the keel of the leadship has been laid. Testing has begun on some major components and propulsion plant development is keeping pace with the ship construction schedule. A follow-on higher performance plant is in early stages of development and will be available for submarines in the mid 1970's shipbuilding program.

Also in the program is a project for developing an improved reactor plant for future use in smaller surface combatants (frigates and destroyers).

MARINE CORPS PROGRAMS

Marine Corps R&D programs are primarily carried out in conjunction with the other Services. For example, the Marine Corps and the Army are involved in several joint efforts in the weaponry area: encapsulated flame rounds to provide all tanks with a flame capability; advanced REDEYE, a lightweight air defense weapon to provide a man-transportable surface-to-air missile system; and a tactical motor transport vehicles project. In addition, the Army and the Marine Corps are working together on the critical problem of hostile weapons location. The Air Force and the Marine Corps are nearing completion of development of a tactical intelligence system. The Marine version is called MAGIS (Marine Air/Ground Intelligence System).

The Lightweight Three-Dimensional Ground Control Intercept Radar (AN/TPS-59) which was initially a joint Marine Corps/Army/Air Force effort, is now undergoing engineering tests. The primary function of this radar will be to provide long range surveillance and ground control intercept capability to the Marine Landing Forces in an amphibious environment.

Of significance in FY 1973 is the first appearance of the Marine Integrated Fire and Air Support System (MIFASS) and the Tactical Combat Operations System (TCO), two of the seven functional systems envisioned under the Marine Tactical Command and Control System (MTACCS) concept.

IV

MANAGEMENT

Recent years have seen several problems arise which have challenged our capability to find better ways of dealing with them. I can give you some feeling for how we cope with these problems by explaining what we are doing.

INCREMENTAL FUNDING - Incremental funding, that is, asking for money to support only a year's effort, has been a feature of the RDT&E budget requests for several years. Last year, two Congressional committees provided in their reports some new guidance as to how incremental funding is to be implemented in the future. In responding to the guidance, we have found the most difficult job is to translate the new requirements into clear and practical instructions to the people on the project level who must do the detailed planning. For that reason, I recently called all of our major project managers together and met with them for the purpose of explaining the new guidance. We also formed a team of knowledgeable people including two flag officers and conducted a line-by-line review of the budget submissions for our larger projects. Based on that review, we have made reductions where we could determine that funding had been requested to do work which should be funded in FY 1974. These management actions have brought the Navy into compliance with the guidance to the maximum extent feasible in the short time between receiving definitive guidance and the completion of the FY 1973 budget. We will continue to emphasize this in the future.

UNOBLIGATED BALANCES - We have devoted a lot of effort to the reduction of unobligated end-of-year balances; over the years since 1966, we have reduced the fraction carried forward at the end of the year from 19 percent to less than 11 percent. The way we have done this is to place a time limit for obligation on our programs which is more restrictive than the law requires. By requiring the projects to make available for other uses any funds which were not required for immediate obligation, we have provided an incentive which has resulted in improved utilization of the funds and lower carryover. Our rate of progress is accelerating somewhat and we hope to reduce the amount about 6 percent by the end of the current year. Management of this problem has been especially challenging since the business of contracting for work is complicated and heavily bound up in regulations.

LABORATORIES - Management has two challenges in this area. First, we must insure that we have a good system for linking the people and technoloty in the laboratories to the important technical problems of the Navy and the Marine Corps. This must be done in such a way that the laboratory has an incentive to produce not only satisfactory, but the very best solutions to the important problems in an efficient and low-cost way. Our approach to this challenge has been to institute service funding, or in Navy parlance, Industrial Funding. The laboratories get their funds by "contracting" with a responsible individual in the Naval Material Command or in one of the Systems Commands under the Naval Material Command to do work in their particular area of competence. Sometimes, several laboratories may be involved in a program, each contributing as its competence permits and as the person holding the funds instructs. The people

responsible for program progress can and do balance work between private industry and the in-house laboratories depending on expertise and costs. We have found this method of financing to be part of a good management solution to the problem of keeping the laboratories busy on the important problems. In addition, we provide some funds directly to the control of the laboratory directors (Independent Research and Independent Exploratory Development) so that they can work on problems that they identify as technological opportunities to solve Navy and Marine Corps problems identified through their direct contact with the fleet and Marine Corps units. The balance of two types of funding works well and can be adjusted as experience dictates. Currently, we want to somewhat increase the Independent Exploratory Development.

A second challenge to our management has been one we have recognized and which the Congress commented upon last year, namely the need to make more use of laboratories in the acquisition of major weapon systems. The Navy will continue to apply the lead laboratory concept as suggested, and is broadening the role of laboratories in systems acquisition. In several cases (AGILE at Naval Weapons Center, China Lake, and CAPTOR at Naval Ordnance Laboratory), we have assigned to laboratories the function of managing total programs during the development phase and we will probably do more of this in the future if it becomes clear, as we expect, that the laboratories can do a good job of managing.

FEDERAL CONTRACT RESEARCH CENTERS - For each of the past several years, the Congress has taken specific note of the Federal Contract Research Centers. I have found the suggestion that the FCRC functions should be taken in-house to be a difficult manage-

ment challenge, and I would like to explain why this is particularly so in the case of the Center for Naval Analyses.

We have at CNA a mix of people that seems right for addressing the most broad guage and central problems of the Navy. It is the only place where we have been able to draw together people with current experience on fleet operations, weapon systems analysis, logistics, economics, and with general policy. We do not feel that we are abdicating a responsibility in retaining this sort of contractor assistance to work on these central problems. Repeated trials have shown that we are unlikely to get enough of a stubborn independence of view from in-house organizations. We feel that we must have this independent point of view to make the studies good enough to be believable, by us or by anyone else.

We still have this question under active review. In the meantime, we are thoroughly re-examining our study program to make sure that we are putting in-house everything that we can accomplish there; and we have submitted to you a FY 1973 work program for CNA that has been restricted to 105 percent of the amount authorized by the Congress for FY 1972.

With all that I have discussed today, I must not leave you with the impression that we have been able to do all of the things we would liked to have done or that we have proceeded as rapidly as we would have liked. Fiscal and other constraints preclude such an ideal situation. Were additional funds available, we would pursue efforts in such areas as: Additional advanced prototyping; cryogenic power; reliability and maintainability to reduce operations and maintenance costs; design to reduce the impact of the All-Volunteer Navy; surveillance of all kinds; and through all this, to get more experiments to sea

earlier than planned to insure that we have a clear understanding of the fundamentals prior to full commitment for development.

V

CONCLUSION

Mr. Chairman, my presentation today has been intended to highlight the thrust of the Research, Development, Test and Evaluation, Navy and USMC program for FY 1973 and to show how the program will produce the weapons and equipment needed for the future Navy. In addition, I have described how we have approached solutions to some of our more immediate, as well as our continuing problems. Principal among these is the need to make the most careful decisions early about the exact extent to which we must extend our performance to fulfill the requirements of national policy. We are trying to develop systems better tuned to the total procurement equation, an equation in which resource limits play a large role. We are evaluating management disciplines to get the most of every dollar and every man in the R&D community. I believe you will observe some results of our efforts in this line in the Navy FY 1973 program.

Given your approval, we will proceed with the conduct of this R&D program as another step in the direction of providing our naval forces with the capability to stand up to the challenges of today and tomorrow in the arena of the world's oceans.

Mr. Chairman, I request the support of the Committee and I am prepared to answer any questions as you may desire.

SUBCOMMITTEE RECESS

Chairman ELLENDER. Any questions?
Senator YOUNG. No.
Chairman ELLENDER. Thank you very much.
(Whereupon, at 12:30 p.m., Wednesday, March 8, 1972, the subcommittee recessed, to reconvene at 10 a.m., March 9.)

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1973

WEDNESDAY, MAY 3, 1972

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee met at 10 a.m., in room S–126, the Capitol, Hon. Milton R. Young presiding.

Present: Senator Young.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE NAVY

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, NAVY

STATEMENT OF HON. ROBERT A. FROSCH, ASSISTANT SECRETARY OF THE NAVY (RESEARCH AND DEVELOPMENT)

ACCOMPANIED BY:

VICE ADM. R. WEYMOUTH, USN, DIRECTOR OF RESEARCH, DEVELOPMENT, TEST AND EVALUATION, OFFICE OF THE CHIEF OF NAVAL OPERATIONS

REAR ADM. S. H. MOORE, USN, DIRECTOR OF BUDGET AND REPORTS, OFFICE OF THE NAVY COMPTROLLER

REAR ADM. H. E. LYON, USN, MANAGER, UNDERSEA LONG RANGE MISSILE SYSTEM PROGRAM

REAR ADM. L. W. MOFFIT, USN, DIRECTOR, NAVY SPACE PROGRAM DIVISION (OPNAV)

COMDR. O. C. LOCKE, HARPOON PROGRAM (OPNAV)

COMDR. J. T. PARKER, USN, SPECIAL ASSISTANT TO ASSISTANT SECRETARY OF THE NAVY (R. & D.)

MRS. M. FERGUSON, COMPTROLLER, OFFICE OF NAVAL RESEARCH

COMDR. W. J. SHAFER, USN, OFFICE OF THE NAVY COMPTROLLER

BUDGET AMENDMENT FOR 1973

Senator YOUNG. Continuing the testimony on the requests for budget amendments for fiscal year 1973 as contained in House document 92–272, the committee will now hear testimony on the additional request for $63.8 million for the "Research and development, Navy," appropriation.

This will increase the budget request for fiscal year 1973 from the $2,729,987,000, originally submitted by the President, to $2,793,787,000.

The summary information on pages 39 through 45 of the justifications will be included in the record.

(The information follows:)

DEPARTMENT OF THE NAVY FISCAL YEAR 1973 BUDGET AMENDMENT—RESEARCH DEVELOPMENT TEST AND EVALUATION NAVY (PROGRAM AND FINANCING)

[In thousands of dollars]

Direct program by activities	Budget plan			Obligations		
	Request pending	Proposed amendment	Revised request	Request pending	Proposed amendment	Revised request
1. Military sciences	151, 144		151, 144	151, 353		151, 353
2. Aircraft and related equipment	380, 930	4, 000	384, 930	386, 521	4, 000	390, 521
3. Missiles and related equipment	962, 312	44, 000	1, 006, 312	954, 101	44, 000	998, 101
4. Military astronautics and related equipment	89, 821	10, 000	99, 821	90, 249	10, 000	100, 249
5. Ships, small craft and related equipment	430, 203		430, 203	425, 976		425, 976
6. Ordnance combat vehicles and related equipment	44, 753		44, 753	45, 720		45, 720
7. Other equipment	511, 722	5, 800	517, 522	513, 815	5, 800	519, 615
8. Programwide management and support	159, 102		159, 102	158, 252		158, 252
Total direct	2, 729, 987	63, 800	2, 793, 787	2, 725, 987	63, 800	2, 789, 787
Reimbursable (total)	40, 452		40, 452	44, 452		44, 452
Total	2, 770, 439	63, 800	2, 834, 239	2, 770, 439	63, 800	2, 834, 239
Financing:						
Receipts and reimbursements from:						
Federal funds	−39, 452		−39, 452	−39, 452		−39, 452
Non-Federal sources	−1, 000		−1, 000	−1, 000		−1, 000
Unobligated balance available start of year:						
For completion of prior year budget plans				−150, 000		−150, 000
Available to finance new budget plans						
Reprogramming from (—) or to prior year budget plans						
Unobligated balance transferred from other accounts						
Unobligated balance transferred to other accounts						
Unobligated balance available, end of year for completion of prior year budget plans				150, 000		150, 000
Budget authority	2, 729, 987	63, 800	2, 793, 787	2, 729, 987	63, 800	2, 793, 787
Appropriation	2, 710, 900	63, 800	2, 774, 700	2, 710, 900	63, 800	2, 774, 700
Appropriation (adjusted)	2, 710, 900	63, 800	2, 774, 700	2, 710, 900	63, 800	2, 774, 700
January 1972 pay increase amendment	19, 087		19, 087	19, 087		19, 087
Relation of obligations to outlays:						
Obligations incurred, net				2, 729, 987	+63, 800	2, 793, 787
Obligated balance, start of year				1, 044, 607		1, 044, 607
Obligated balance, end of year				−1, 335, 094	−29, 800	−1, 364, 894
Outlays, excluding pay increase supplemental				2, 436, 972	+34, 000	2, 470, 972
Outlays from civilian pay act supplemental				2, 528		2, 528

Fiscal Year 1973 R.D.T. & E., N. Budget Amendment

Narrative statement

Developments since the submission of the fiscal year 1973 budget request in January make it necessary to submit an amendment for the Research, Development, Test and Evaluation, Navy Appropriation. The proposed amendment would increase the budget authority requested by $63.8 million. This is in addition to a previously transmitted proposed amendment amounting to $19.087 million in this appropriation for the January 1, 1972, Federal pay increase.

The fiscal year 1973 budget amendment for R.D.T. & E., N. in the amount of $63.8 million is required in order to conduct important research and development effort which falls into three categories, as set forth below:

	Budget plan (dollars in thousands)		
	Request pending	Proposed amendment	Revised request
I. Program aimed at meeting a clear near term Soviet threat:			
A6 squadrons (A6E/TRAM)	$4,400	$1,800	$6,200
A7 squadrons (A7E/TRAM)	3,460	2,200	5,660
Cruse missiles (advanced)	16,000	4,000	20,000
Antiship weaponry (advanced)	58,265	2,000	60,265
Space technology (advanced)	[deleted]	10,000	[deleted]
Undersea long range missile system (ULMS) (engineering)	520,400	35,000	555,400
II. Programs designed to improve our capability to conduct operational test and evaluation: Surface-launched weaponry, systems and technology (engineering)	62,349	3,000	65,349
III. Programs to attack the high cost of weapons through less costly design and improved maintenance and reliability: Reliability and maintainability initiative	5,000	5,860	10,800

PROJECT LISTING

[In thousands of dollars]

Element Code	Project No.	Title	Fiscal year 1971 actual	Fiscal year 1972 estimate	Fiscal year 1973 estimate: Request pend ng	Fiscal year 1973 estimate: Proposed amend-ment	Fiscal year 1973 estimate: Revised request
GENERAL PURPOSE FORCES							
2. Aircraft and related equipment:							
24114N		A6 squadrons		1,525	4,900	1,800	6,700
	W1193	A6E/TRAM (target recognition attack multisensor).		1,525	4,400	1,800	6,200
24115N		A7 squadrons		500	3,560	2,200	5,760
	W1196	A7E/TRAM (target recognition attack multisensor).		500	3,460	2,200	5,660
Subtotal, general purpose forces.						4,000	
Total, aircraft and related equipment.						4,000	
6.3 ADVANCED DEVELOPMENT							
3. Missiles and related equipment:							
63357N		Cruise missiles (advanced).		10,000	16,000	4,000	20,000
	W1313	Encapsulated Harpoon		2,700	14,000	2,000	16,000
	W1314	Advanced missiles		7,300	2,000	2,000	4,000
63359N	W1174	Antiship weaponry (advanced)—Air-launched/surface-launched antiship missile (Harpoon).	17,854	36,530	58,265	2,000	60,265
Subtotal, advanced development.						6,000	

PROJECT LISTING—Continued

[In thousands of dollars]

Element Code	Project No.	Title	Fiscal year 1971 actual	Fiscal year 1972 estimate	Fiscal year 1973 estimate: Request pending	Fiscal year 1973 estimate: Proposed amendment	Fiscal year 1973 estimate: Revised request
6.4 ENGINEERING DEVELOPMENT							
64352N		Surface-launched weaponry, systems and technology (engineering).	37,963	50,501	62,349	3,000	65,349
	U1226	Close in weapon system (Phalanx).	8,200	11,615	8,922	3,000	11,922
64360N	B1509	Undersea long range missile system (ULMS) (engineering).	.....	104,837	520,400	35,000	555,400
Subtotal, engineering development.						38,000	.....
Total, missiles and related equipment.						44,000	.....
6.3 ADVANCED DEVELOPMENT							
4. Military astronautics and related equipment:							
63451N		Space technology (advanced).	10,428	[Deleted]	[Deleted]	10,000	[Deleted.]
	W4415	Program 749	8,211			10,000	
Subtotal, advanced development.						10,000	.....
Total, military astronautics and related equipment.						10,000	.....
7. Other equipment:							
63791N	R41ZZ	Reliability and maintainability initiative.	.....		5,000	5,800	10,800

Purpose of Amendment

Senator Young. The principal witness will be Assistant Secretary of the Navy for Research and Development, Robert A. Frosch.

You may proceed, Mr. Secretary.

Mr. Frosch. Good morning.

I am appearing before you today in support of the amendment to the R.D.T. & E., Navy budget request for fiscal year 1973.

This request is for $63.8 million in addition to the $2.73 billion contained in the budget request already before you and is for the purpose of carrying out research and development efforts which were not included in the fiscal year 1973 budget.

Amendment Requested for Eight Program Elements

The amendment requested is for work under eight Navy program elements.

The table which is the last page of the handout before you lists the programs involved, the amount previously requested for fiscal year 1973 and the amount requested here today.

The justification book provided to the committee contains detailed information about the supplemental request.

I will now describe the programs briefly and then respond to questions you may have.

ULMS ACCELERATION

Senator YOUNG. The first item is the additional $35 million being requested for the acceleration of the ULMS program. The original request of $520.4 million for this program was discussed earlier, and that discussion is on pages 101, 811, 929, and 1439 of the hearings. The revised descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. AMENDMENT DESCRIPTIVE SUMMARY

UNDERSEA LONG RANGE MISSILE SYSTEM

Project.—B1509 undersea long range missile system (ULMS).

Amendment category.—Program aimed at meeting a clear near term Soviet threat.

Background.—United States relies upon its ability to launch massive nuclear counterstrike as primary deterrent to any nation preempting nuclear attack. Credible counterstrike capability directly depends upon a counterstrike force whose survivability is invariant with any preemptive attack upon it. Submarine based strategic missile is principal element of National nuclear deterrent forces. Continuing survivability of submarine based strategic missile force is of critical importance. ULMS was conceived to make submarine based strategic missile force relatively invulnerable to broad spectrum of potential future threats, establishing a relatively invariant deterrence credibility. Initial inputs for ULMS Concept were derived from "STRAT-X Report" of August 1967. Studies and analyses further refined ULMS concept. CNO issued an Advanced Development Objective (No. 15–09X) for ULMS 1 February 1969 with 1–A importance classification. Secretary of Defense, on 23 December 1971 approved Program Budget Decision No. 317 which calls for an accelerated ULMS Program.

Description.—ULMS consists of two major subsystems; primary strategic missile system, and mobile undersea base, i.e., submarine system. ULMS missile and submarine developments will utilize advances in technology and a goal oriented design approach to increase employment flexibility, significantly reduce vulnerability of submarine, enhance survivability of payload delivered, and greatly expand dimensions of U.S. counterstrike force. The initial missile will be designed to be deployed on both existing POSEIDON submarines and the new ULMS sub. The ULMS submarine will have larger tubes for future missile growth potential.

Related activities.—ULMS development will be implemented in close coordination SSN 688 Class and Later Design SSN Submarine Project and the POLARIS/POSEIDON Project. Development will benefit from OSD ABRES Program and will require joint Atomic Energy Commission participation [deleted].

Performed by.—Lockheed Missiles and Space Corporation, Sunnyvale, Calif.; Electric Boat Division of General Dynamics Corporation, New London, Conn.; General Electric Company, Schenectady, N.Y.; Massachusetts Institute of Technology/Draper Laboratory, Boston, Mass.; Naval Ship Research and Development Center, Washington, D.C.; Naval Underwater Sound Center, Newport, R.I. and numerous other contractors.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal Year 1971 and prior accomplishments.—During early program phase (Fiscal Years 68–70) various parametric design and trade-off studies were conducted in order to derive optimum ULMS system configuration. Fiscal Year 1971 nuclear reactor design initiated. Missile performance trade-off studies defined gross missile physical characteristics, which in turn established spectrum of potential performance achievable by missile. Evolutionary process of sizing ULMS submarine resulted in initial baseline physical parameters. Preliminary requirements for ULMS integrated radio room (IR^2) were derived and designed approach selected from several candidate approaches.

Fiscal Year 1972 program.—Commence development of long lead time nuclear reactor components and complete propulsion plant preliminary design. Initiate ship contract design and complete ship baseline design. Start construction propulsion plant mockup. Improved submarine technology for submarine sub-systems such as sonar, defensive weapon system and submarine silencing will be emphasized. Complete missile system preliminary design definition. Major effort will be devoted to development of advanced missile technology leading to long range ULMS–1 missile and Ballistic Re-entry Vehicle (BRV). Support site planning will commence.

Fiscal Year 1973 planned program.—In fiscal year 1973 we will initiate effort [deleted]. These efforts are necessary at this time to define requirements and design in order to meet a system IOC of fiscal year 1979.

Program to completion.—Completion of the development aspects of program will lead to the ability to deploy a highly survivable sea-based strategic deterrent force.

RESOURCES

[In thousands of dollars]

	Fiscal year—			Additional to completion	Total estimated cost
	1971 and prior	1972	1973		
R.D.T. & E., N.:					
Basic	60,200	104,837	520,400	Deleted.	
Amendment			35,000		
Total			555,400	Deleted.	

Note: Funding prior to fiscal year 1973 was under following program elements: Fiscal year 1968/1969—Program elemen 63308N; fiscal year 1970/1971—Program element 63360N; fiscal year 1972—Program element 64360N.

Dr. FROSCH. You have seen in our fiscal year 1973 submission a substantial acceleration in the development of the ULMS which includes both a new submarine and a new missile. The decision to accelerate the ULMS program was made in December 1971.

The goal of an initial operational capability in fiscal year 1979 requires additional effort beyond that which can be supported by the funds in the fiscal year 1973 budget.

The amendment requests $35 million in order to develop an orderly transition into the much larger profile of effort desired. This additional funding will be applied principally to start the submarine baseline design and to commencement of submarine contract decish.

Design and procurement of the missile supporting systems aboard the submarine will be initiated in order to support the overall accelerated program planned for the next few years.

The accelerated program is intended to give the R. & D. support required to achieve an IOC in fiscal year 1979 of the new submarine with a new missile and concurrently provide the possibility of improved longer range missiles in our Poseidon submarines in fiscal year 1978.

AUTHORIZATION REGIMENT

Senator YOUNG. This money has to be authorized for the ULMS program before it is appropriated; is that correct?

Dr. FROSCH. Yes; it will have to be authorized before appropriation.

Senator YOUNG. We don't know what position the Senate Armed Services Committee will take.

Admiral MOORE. I do not believe there has been an announcement by either the House or Senate Armed Services Committee on the ULMS program.

PROGRAM 749

Senator YOUNG. The next item is the request for an additional $10 million for program 749. As I recall, our earlier discussion of the original request [deleted] for this program was off the record.

Mr. WOODRUFF. That is correct.

Senator YOUNG. The revised descriptive summary will be included in the record at this point.

(The information follows:)

BUDGET AMENDMENT FOR 1973

FISCAL YEAR 1973 R.D.T. & E. AMENDMENT DESCRIPTIVE SUMMARY

SPACE TECHNOLOGY (ADVANCED)

Project.—W4415 program 749.

Amendment category.—Programs aimed at meeting a clear near term Soviet threat.

Background.—Advanced Development effort to design, build and ground qualify satellite borne sensor subsystem that would ultimately function in space system. Studies conducted to identify major development risk areas and define basic sensor subsystem configurations. Navy expanded scope of program to include development of satellite system. Concept formulation effort to define system configuration and to continue development and test of critical components of sensor subsystem.

Description.—[Deleted].

Related activities.—Navy Command Information Systems.

Work performed by.—Navy Space Project Office (PM–16); Naval Research Laboratory and Navy Space Systems Activity; and, Hughes Aircraft Company Research Corporation, Watkins Johnson, and Lockheed Aircraft Corporation, Burbank, California.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1971 and prior accomplishments.—Conducted extensive sensor and system studies for a [deleted] satellite system. Technology efforts involved the development of [deleted].

Fiscal year 1972.—[Deleted].

Fiscal year 1973 planned program.—[Deleted].

Program to completion.—[Deleted].

RESOURCES

[In thousands of dollars]

	Fiscal year—			Additional to completion	Total estimated cost
	1971 and prior	1972	1973		
R.D.T. & E., N.:					
Basic	14,164			Deleted.	
Amendment					
Total					

Senator YOUNG. Proceed.

Dr. FROSCH. The request of $10 million for program 749 will allow for initial efforts [deleted] high-flying aircraft to provide an ocean surveillance [deleted] to support our forces at sea.

HARPOON ANTISHIP MISSILES

Senator YOUNG. The budget amendment includes an additional $2 million for the basic Harpoon missile program, giving a revised request of $60,265,000, and an additional $2 million for the encapsulated Harpoon missile program for a revised request of $16 million.

The original requests for these programs were discussed earlier in these hearings and the discussion of these requests can be found on pages 85, 632, 977, and 1442 of the hearings.

The revised descriptive summaries for these programs will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. AMENDMENT DESCRIPTIVE SUMMARY

ANTISHIP WEAPONRY (ADV)

Project.—W1174 air launched/surface launched antiship missile—HARPOON.

Amendment category.—Programs aimed at meeting a clear near term Soviet threat.

Background.—The impressive Soviet bloc success in operational deployment of a sophisticated mix of air-launched and ship-launched antiship missiles represents a major tactical threat to U.S. Naval forces at sea, and a very real strategic threat to U.S. control of the seas.

The optimum means of destroying the threat has been the subject of years of intense study, debate, and planning within the Navy. These efforts have culminated in a program to equip U.S. aircraft and ships with a lethal antiship missile system, the Air-Launched/Ship-Launched Antiship Missile System (HARPOON).

Description.—The HARPOON Weapon System consists of a missile, an aircraft command and launch subsystem, a shipboard command and launch subsystem, and support equipment required to provide for the handling and testing of the system.

The HARPOON missile uses an active radar seeker, [deleted]. The missile is propelled by a turbojet sustainer, augmented by a solid booster for ship launch. The missile is standard 13.5-inch diameter. Length and weight [deleted] are such that it is compatible with TARTAR, TERRIER, and ASROC ship launchers, as well as aircraft launchers.

Aircraft Command and Launch Subsystem is structured around a HARPOON dedicated fire control system which utilizes a digital computer. A missile control panel is added to provide those command, control, and display functions not available from existing aircraft equipment. Launch control is achieved through minimum modifications to the present aircraft armament control subsystem.

Ship Command and Launch Subsystem is also structured around a HARPOON dedicated fire control system which utilizes a digital computer. A HARPOON indicator panel will provide HARPOON status for the launch operator. This subsystem interfaces with and shares displays, launch control panels, and launchers with existing ship weapon systems.

Related activities.—HARPOON program; Ships Anti-Ship Missile Defense Program; LAMPS Program.

Work performed by.—Naval Avionics Facility, Indianapolis, Indiana; Naval Weapons Center, China Lake, California; Naval Weapons Laboratory, Dahlgren, Virginia; Naval Research Laboratory, Washington, D.C.; Applied Physics Laboratory/Johns Hopkins University, Silver Spring, Maryland; McDonnell-Douglas Corporation; Texas Instruments, Inc.; Sperry Rand Corporation; Aerojet Solid Propulsion Co.; Airesearch of Garrett Corp.; and Teledyne CAE.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1971 and prior accomplishments.—New element in fiscal year 1969, however, numerous earlier studies regarding air-launched and surface-launched anti-shipping missiles had been conducted. In fiscal year 1968 Concept Formulation for an air-launched version only (HARPOON/ALSAM) commenced, a measurement program investigating various radar seeker techniques. The Over-the-Horizon Study Group investigated the surface-launched missile and the Chief of Naval Operations sponsored Surface-to-Surface Missile Pilot Study was completed. Convergence of air- and surface-launched requirements and financial benefits to be realized from commonality lead to the formation of a Joint Task Force within the Naval Material Command. Group provided in-depth information to CNO, highlighting both advantages in performance and costs resulting from commonality requirements. By Specific Operational Requirement 11–74R1 dated

June 19, 1969 a single missile development program was initiated. The Naval Air Systems Command was designated as Principal Development Activity, to be supported by Naval Ordnance Systems Command.

A validation phase was completed to provide testing, data reduction, and/or analysis of the various portions of the HARPOON Weapon System. Terminal guidance testing, warhead effectiveness tests and studies, third party target location analysis, cost studies, missile survivability analysis, midcourse guidance parameter analysis, turbine engine analysis, and other efforts comprise the validation phase.

A contract for the Engineering Design Phase was awarded June 23, 1971. This contract provides for design and flight test of 12 complete engineering models with McDonnell-Douglas Corporation. Additionally, contracts have been awarded to Airesearch and Teledyne, CAE for the design fabrication of test of turbojet demonstration engines. Successful test runs have been made on both engines.

Fiscal year 1972 program.—Design of a HARPOON missile and associated air and shipboard equipments will take place. Preliminary design review will begin in the mid-part of the fiscal year. Fabrication of special support equipment and modification of a ship and aircraft launch platform will begin. A single jet engine contractor will be selected. Special flight test vehicles, including missiles for launcher test, guidance test, aerodynamic test and jettison tests will be under construction.

Fiscal year 1973 planned program.—[Deleted.]

Program to completion.—The Weapon System Development phase where [deleted] prototype missiles will be developed and tested will be completed by [deleted]. In this phase, Contractor Technical Evaluation, Navy Technical Evaluation and Operational Evaluation will be accomplished. Phase 4, the Pilot Line Phase, will commence in [deleted] and will provide [deleted] pilot line missiles for use in the Navy Operational Evaluation program and first fleet introduction. This phase will be followed by continued production to meet inventory requirements. IOC (Initial Operational Capability) is programmed for [deleted].

MILESTONE PLAN FOR HARPOON WEAPON SYSTEM

[Deleted.]

RESOURCES

[In thousands of dollars]

	Fiscal year—			Additional to completion	Total estimated cost
	1971 and prior	1972	1973		
R.D.T. & E., N.:					
Basic	27,700	36,530	58,265	Deleted.	
Amendment			2,000		
Total			60,265		

FISCAL YEAR 1973 R.D.T. & E. AMENDMENT DESCRIPTIVE SUMMARY

CRUISE MISSILES (ADV)

Amendment category.—Programs Aimed at Meeting a Clear Near Term Soviet Threat.

Project.—W1313 Encapsulated HARPOON.

Background.—Unfriendly seapowers are rapidly achieving the capability of sustaining a presence or exerting pressure in any corner of the globe at any time. This presence can become a deciding influence unless the U.S. can counter this threat with naval weapons that are technically superior.

In response to this threat, the Submarine Launched Anti-Surface Ship Interim Missile Ad Hoc Panel, established by the Chief of Naval Operations, recommended that the HARPOON missile be adapted for submarine use through the employment of encapsulated launch techniques. As an initial step it was recommended that the HARPOON missile be encapsulated for launch [deleted].

Description.—The objective of the program is to provide existing first line attack class nuclear submarines with a stand-off anti-surface ship weapon [deleted].

Related activities.—Work being performed under Project W1174 (HARPOON) is directly related to this effort and forms the technical basis for all weapon performance after capsule broach and separation. Hydrodynamic performance of the capsule from launch to broach has been previously investigated under Program Element 62611N (Encapsulated Missile Technology Development) and will be used as a point of departure for the present effort.

Work performed by.—Navy laboratories and activities: Naval Undersea Research and Development Center, Naval Ship Research and Development Center, Naval Ordnance Laboratory, Naval Undersea Systems Center, Naval Air Systems Command Headquarters, Naval Ordnance System Command Headquarters, Naval Ship Engineering Center. Contractors: McDonnell-Douglas, St. Louis, Missouri.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1971 and prior accomplishments.—[Deleted.]

Fiscal year 1972 program.—[Deleted.]

Fiscal year 1973 planned program.—[Deleted.]

Program to completion.—The existing HARPOON Technical Development Plan, Specific Operational Requirement and design contract will be modified to include the submarine as a launch platform. Additional HARPOON flight test and guidance test missiles will be procured and demonstrated in parallel with the existing air and surface launch program. Capsules will be designed and tested together with the development of weapon control equipment for the submarine. Contractor and Navy Technical Evaluations and Operational Evaluation programs will be accomplished so as to permit an initial operational capability of [deleted].

RESOURCES

[In thousands of dollars]

	Fiscal year—			Additional to completion	Total estimated cost
	1971 and prior	1972	1973		
R.D.T. & E., N.:					
Basic		2,700	14,000	14,700	33,400
Amendment			2,000		
Total			16,000		

Dr. Frosch. In our Harpoon antiship missile effort, the program approval by the Deputy Secretary of Defense directed that an additional $3 million be applied to the basic Harpoon program to bring program funds in line with the development plan which provided for some acceleration without changing the total program costs.

Senator Young. You stated that this additional $2 million for the Harpoon antiship missile effort is to provide for "some acceleration without changing the total program costs." What is involved in this "some acceleration"?

Dr. Frosch. We had planned certain profiles of obligation of funds to the contractor before we went out with an RFP and before we had actual proposals. When we got the actual proposals in the profile of spending, the big bidder's proposal was a little bit faster at the beginning of the program and a little bit slower toward the end of the program. The total funding over the history of the program is estimated to be the same.

The way the program is phased, it would start up a little bit faster. That is the sense in which the word "acceleration" is used here. This funding is to bring the funding of the program into consonance with the actual contract.

Senator Young. Can you do this within the $58.3 million requested?

Dr. FROSCH. Which is the 1973 amount? No. This is additional to the $58.3 million in 1973 but would be taken out of our estimate for 1974 or 1975. The supplemental amount has since been adjusted to the $2 million requested here today.

Our budget request for fiscal year 1973 contains a program element entitled "Cruise missiles" which contains two projects.

In one project, we plan to gain an early capability to launch tactical antishipping missiles from submarines by adapting the Harpoon missile for this purpose. The plan is to provide a watertight capsule to contain the missile and launch the encapsulated Harpoon from the torpedo tubes.

Recent exploratory development has given us confidence in the feasibility of firing encapsulated missiles so we now wish to move forward more rapidly in concert with the Harpoon development in order to circumvent the changes that slower progress would likely engender. We feel a sense of urgency in the project.

We do not now have a weapon of competitive range. Two million dollars are requested in the amendment for this accelerated work.

Senator YOUNG. The original fiscal year 1973 budget includes $14 million for the encapsulated Harpoon missile. The budget amount is for an additional $2 million for a total of $16 million. What will you accomplish with this $2 million?

Dr. FROSCH. Can I ask Commander Locke, who is here from the Harpoon project, to respond?

Commander LOCKE. I understand you want to know what will be accomplished with the additional $2 million.

Senator YOUNG. Yes.

Commander LOCKE. [Deleted.]

Dr. FROSCH. The second project in this area is titled "Advanced missiles" and is to develop the system for the post-Harpoon generation of antishipping missiles to be used in submarines primarily, but also for surface ship applications. [Deleted.]

CRUISE MISSILES—ADVANCED

Senator YOUNG. The next item is the request for an additional $2 million for the project entitled, "Cruise missiles, advanced." The original fiscal 1973 request included $2 million for this effort, and a discussion of this request can be found on page 1157 of the hearings. The revised descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. AMENDMENT DESCRIPTIVE SUMMARY

Amendment Category.—Programs aimed at meeting a clear near term Soviet threat.

Project.—W1314 advanced missiles.

Background.—Unfriendly seapowers are rapidly achieving the capability of sustaining a presence or exerting pressure in any corner of the globe at any time. This presence can become a deciding influence unless the U.S. can counter with naval weapons that are superior. Analysis indicates that a long range [deleted] missile capable of low altitude flight and deliverying a large conventional warhead would be an effective weapon and should be developed for launching from surface ships and submarines. Such a weapon could successfully engage and neu-

tralize typical enemy task forces of high value targets such as ASW carriers and missile cruisers escorted by modern guided missile destroyers without approaching within range of enemy unassisted sensor capability. Submarine survivability would be greatly enhanced. Variations of this weapon would provide significant enhancement of strategic capabilities.

Components for new anti-ship missiles system had been in exploratory development for about five years. Based on the threat, the need and the technology in hand, development of a Submarine Tactical Anti-Ship Weapons System (STAWS) was commenced but we have since modified the program by dividing it into two projects. The first project is to provide a tactical missile for our inventory of first line SSNs as soon as possible by encapsulating the HARPOON missile so that it could be launched from a submerged submarine (see Project W1313). The second project is to develop a missile for the post-HARPOON generation of anti-shipping missiles and to [deleted].

Description.—The object of this project is to provide future submarines and surface ships with [deleted] long range tactical cruise missiles designed to be effective against surface ships [deleted]. The engineering effort will stress the applicability of new technology [deleted].

Related activities.—Project W1174 (HARPOON); Program Element 62611N (Encapsulated Missile Technology Development).

Work performed by.—Navy laboratories and activities: Naval Ordnance Laboratory; Naval Ship Research and Development Center; Naval Undersea Research and Development Center; Navy Ship Systems Command; Naval Air Systems Command; Naval Ordnance Systems Command; Naval Ship Engineering Center; Applied Physics Laboratory/Johns Hopkins University.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1971 and prior accomplishments.—Weapons System Tradeoff analyses were conducted to assure that the baseline weapon configuration represents the best combination of overall systems effectiveness and life cycle cost. Effort included systems studies to determine total sub-system requirements. [deleted]. Analyses determined feasibility, effectiveness, cost and schedule of a series of possible missile systems, starting with modifications to HARPOON Missile System up to advanced missile systems.

Fiscal year 1972 program.—During FY 72, the first portion of the Validation Phase will be performed whereby detailed program plans will be formulated for complete development cycle. In FY 72, definition of initial missile system will be complete. Critical experiments will have begun for [deleted].

Fiscal year 1973 planned program.—In FY 1973, existing components developed by this and other related feasibility demonstration projects will be utilized to produce several scale missile designs for subsequent tests including at-sea tests. Specific tests will be performed [deleted]. The missile performance specification will be prepared together with the request for industry participation. Upon receipt of the proposals Source Selection will be accomplished and the design, development and manufacture of full scale test vehicles will be initiated. The engineering effort will stress the applicability on new technology to [deleted] missiles for both surface and submarine programs.

Program to completion.—[Deleted.]

Full scale engineering development will be conducted leading to full operational capability concurrent with the availability of the launch platforms.

RESOURCES

[In thousands of dollars]

	Fiscal year—				
	1971 and prior	1972	1973	Additional to completion	Total estimated cost
R.D.T. & E.N.:					
Basic		7,300	2,000	287,466	298,766
Amendment			2,000		
Total			4,000		

Dr. FROSCH. An additional $2 million is required here to expand our earlier work [deleted].

The same rationale and sense of urgency that forced us to accelerate ULMS forces us to proceed as expeditiously as possible with advanced missile development for the applications mentioned.

Senator YOUNG. Attention is called to the fact that $2 million requested for advanced missile development involves the development of [deleted].

What is the military requirement for the development of a [deleted]?

Dr. FROSCH. [Deleted.]

We know so little about the technology that would go to [deleted] characteristics that would be interesting so that we feel we need to do some initial work just to explore that this is a sensible possibility.

Senator YOUNG. I note that $7.3 million was available for this effort in fiscal year 1972 and that the original fiscal year 1973 budget included only $2 million for this program.

If this program has such a high priority, why was only $2 million requested in the original 1973 budget?

Dr. FROSCH. At the time we requested the $2 million for this project in the 1973 budget, we were thinking entirely in terms of a [deleted]. The question of the possible [deleted] use came up first the later part of the consideration of the budget, too late to really shift the budget.

We decided it would be attractive to combine examinations of that [deleted] because they are all the same technology and we like to approach it early in the program. We essentially are adding another concept to be looked at in this program. That is what the request is for.

Senator YOUNG. That will make a total of $12 million, then, for fiscal year 1973?

Dr. FROSCH. That would be for the advanced missile project; that would be $7.3 million in the 1972 funding and a total of $4 million in the 1973 funding if the amendment is allowed.

A–6 TRAM PROGRAM

Senator YOUNG. The budget amendment includes an additional $1.8 million for a revised total of $6.2 million for the A–6 target recognition attack multisensor program. A discussion of the original request for $4.4 million for this effort can be found on pages 980, 1083, and 1359 of the hearings.

The revised descriptive summary will be included in the record at this point.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. AMENDMENT DESCRIPTIVE SUMMARY

A–6 SQUADRONS

Project.—W11–93 A–6 Tram (target recognition attack multisensor).

Amendment category.—Programs aimed at meeting a clear near term Soviet threat.

Description.—This project will provide the A6E with improved capability for surveillance of opposing naval forces, discerning intent and the countering of operations during periods of darkness and adverse weather. In cold war, recon-

naissance requires surveillance, identification and classification capability. [Deleted]. The TRAM components will not replace or degrade existing A–6E capability and will weigh less than 350 pounds. Program objectives include maximum commonality with A–7 TRAM.

Related activities.—Air Force B–57G, AC–130 Gunship and F–4 Pave Knife Programs; Army Southeast Asia Night Operations Program; Marine Corps YOV–10D Program.

Work performed by.—Grumman Aerospace Corp., Bethpage, New York; avionics contractor(s) and Naval Field Activities to be determined.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1971 and prior accomplishments.—(N/A).

Fiscal year 1972 program.—Initiate A–6 TRAM Program for required Fleet Introduction Date (FID) in fourth quarter [Deleted]. Complete aerodynamic feasibility testing of the A–6 TRAM proposed configuration. Conduct a detailed A–6 TRAM configuration study and prepare procurement specifications. Award incrementally funded contract(s) for design and development of A–6E TRAM components and installation.

Fiscal year 1973 planned program.—Conduct complete avionics design for FLIR, Laser Designator and LASER Seeker. Initiate prototype aircraft modification. Complete prototype avionics fabrication.

Program to completion.—Fiscal year 1974.—Initiate contractor prototype test and elevation (CTE); initiate Navy Technical Evaluation (NTE); initiate advanced procurement for limited production using aircraft design documentation from prototype development and confirmed by early results of NTE; initiate TRAM modification to A–6 training devices. Fiscal year 1975: Conduct Initial Operational Test and Evaluation (IOT&E); implement limited production and receive first deliveries; initiate OPEVAL. [Deleted]. Due to schedule concurrency required to meet the FID date, any delay will cause corresponding slip in FID date. Additional earlier funding could advance the IOC as the schedule is constrained by the current funding profile.

RESOURCES

[In thousands of dollars]

	Fiscal year—			Additional to completion	Total estimated cost
	1971 and prior	1972	1973		
R.D.T. & E., N.:					
Basic	0	1,525	4,400	16,900	24,625
Amendment			1,800		
Total			6,200		

A–7 TRAM PROGRAM

Senator YOUNG. The amendment also includes an additional $2.2 million for the A–7 TRAM program, for a revised request of $5,660,000. The original request for $3,460,000 is discussed on page 1085 of the hearings. The revised descriptive summary for this program will be included in the record.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. AMENDMENT DESCRIPTIVE SUMMARY

A–7 SQUADRONS

Project.—W1196 A–7 TRAM (target recognition attack multisensor).

Amendment category.—Programs aimed at meeting a clear near term Soviet threat.

Description.—This project will provide the A–7E with improved capability for surveillance of opposing naval forces, discerning intent and the countering

of operations during periods of darkness. In cold war, reconnaissance requires [deleted] surveillance, identification and classification capability. [Deleted.] The TRAM components will not replace or degrade existing A–7E equipment and will weigh less than 275 pounds. Program objectives include maximum commanality with A–6 TRAM.

Related activities.—Air Force B–57G; AC–130 Gunship and F–4 Pave Knife Programs; Army Southeast Asia Night Operations Program; Marine Corps YOV–10D Program.

Work performed by.—Vought Aeronautics Corporation, Dallas; Avionics contractor(s) and Naval field activities to be determined.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1971 and prior accomplishments.—Not funded until fiscal year 1972.

Fiscal year 1972 program.—Initiate A–7 TRAM program for required Fleet Introduction Date (FID) in first quarter [deleted]. Complete aerodynamic feasibility testing of the A–7 TRAM proposed configuration. Conduct a detailed A–7 TRAM configuration study and prepare procurement specifications. Award incrementally funded contract(s) for design and development of A–7E TRAM components and installation.

Fiscal year 1973 planned program.—Conduct complete avionics design for FLIR, Laser Designator and Laser Seeker. Initiate prototype aircraft modification. Complete prototype avionics fabrication.

Program to completion.—Fiscal year 1974—Initiate contractor prototype test and evaluation (CTE); initiate Navy Technical Evaluation (NTE); initiate advanced procurement for limited production using aircraft design documentation from prototype development and confirmed by early results of NTE; initiate TRAM modification to A–7 training devices. Conduct Initial Operational Test and Evaluation (IOT&E); implement limited production and receive first deliveries; initiate OPEVAL. [Deleted.] Due to scheduled concurrency required to meet the FID date, any delay will cause corresponding slip in FID date.

RESOURCES

[In thousands of dollars]

	Fiscal year—			Additional to completion	Total estimated cost
	1971 and prior	1972	1973		
R.D.T. & E., N.:					
Basic	0	500	3,460	12,400	18,560
Amendment			2,200		
Total			5,660		

Dr. Frosch. Funds are also requested to expedite the application of the target recognition and attack multisensor, or TRAM, system to A–6E and A–7E attack aircraft. We have been developing low light level television and scanning infrared systems in parallel in an effort to provide our aircraft with some ability to attack surface targets in darkness or other poor visibility conditions.

Recent experience with [deleted] increase in capability, we now want to capitalize on it on both the A–6 and A–7 aircraft.

The increasing Soviet naval presence, particularly in the Mediterranean, demands that our limited attack aircraft assets must be at full capability under all conditions, night or day, and that we achieve this readiness very quickly.

PHALANX WEAPON SYSTEM

Senator Young. The next item included in the budget amendment is the additional request of $3 million for the Phalanx antiship missile

system. The original request of $8,922,000 is discussed on page 1165 of the hearings. The revised descriptive summary will be included in the record.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. AMENDMENT DESCRIPTIVE SUMMARY

SURFACE LAUNCHED WEAPONRY, SYS/TECH (ENG)

Project.—U1226 close-in weapon system (PHALANX).

Amendment category.—Programs designed to improve our capability to conduct operational test and evaluation.

Background.—The close-in weapon system is being developed to provide a rapid reaction lightweight, self-contained gun weapon system for very close-in protection primarily against the antiship missile threat. System will be capable of employment as short range complement to the Point Defense, 3T Missile Systems, existing naval gun systems, or as a sole defense on ships not equipped with these systems. As presently envisioned, the engagement range for this system will be less than the minimum engagement range of missile system.

Description.—CIWS employs the modified Vulcan gatling type gun and [deleted] Phalanx Fire Control System. Proposed Gun Weapon System will be a self-contained unit consisting of Search/Tracking Radar, high rate of fire, high velocity gun, and digitalized fire control system.

Related activities.—The gun used in Engineering Development is modified version of the 20mm Vulcan gun developed by U.S. Army.

Work performed.—General Dynamics/Pomona (prime contractor), General Electric, Burlington, Vermont; Naval Ship Missile Systems Engineering Station, California; Long Beach Naval Shipyard, California; Naval Missile Center, California; Pacific Missile Range, California; Electromagnetic Compatibility Analysis Center, Maryland; General Electric, Pittsfield, Mass.; Pacific Technica, California; Hercules Powder, California.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM

Fiscal year 1971 and prior accomplishments.—Advanced Development phase was conducted [deleted]. An engineering development contract was awarded in December 1970. System studies were conducted and design of the mount was initiated along with an ammunition program for an optimized round with improved accuracy, velocity and penetration.

Fiscal year 1972 program.—Engineering development is continuing. [Deleted] mount design and fabrication are scheduled. Round optimization is to be completed. Total system integration and testing will begin in [deleted] using the Engineering Development Model and will continue until delivery of prototype in [deleted]. TECH/OPEVAL will be conducted using the prototype during the first five months of 1973.

Fiscal year 1973 planned program.—During FY 1973 we will conduct a special effort to design a very high level of reliability into the system and to increase test for this reliability prior to production. Design and fabrication of prototype will be completed and Technical and Operational Testing Evaluation will be conducted.

Program to completion.—[Deleted.] Scheduled IOC date for system is [deleted].

RESOURCES

[In thousands of dollars]

	Fiscal year—				
	1971 and prior	1972	1973	Additional to completion	Total estimated cost
R.D.T. & E., N:					
Basic	11,600	11,615	8,922	6,050	41,185
Amendment			3,000		
Total			11,922		

CLOSE-IN WEAPONS SYSTEM (CIWS)

Dr. FROSCH. The additional funds requested for the close-in weapons system, or CIWS, will provide for a significantly greater effort to design a very high level of reliability into the system and to increase testing to be certain the desired reliability has been attained before we buy.

The system development has proceeded during the year with such great promise that we are making tentative plans to deploy the system very widely once development and testing are complete.

In order to reduce future maintenance costs of such a significant number of systems, it would be wise to devote additional special effort to maximizing their reliability.

In addition, as the system will be installed in many small ships, we must have a system which requires minimum manpower and skill levels for maintenance.

Of course, as it is to be the last line of defense against a very dangerous threat, we want to be certain that it works as designed when it is needed. We are now at the stage of development for this equipment when additional reliability work can best be started and it is for this reason that the additional funds are requested now.

RELIABILITY AND MAINTAINABILITY INITIATIVE

Senator YOUNG. The last item in the budget amendment is the request for an additional $5.8 million for the project entitled, "Reliability and maintainability initiative," to make a revised request of $10.8 million. The original request of $5 million for this project is discussed on page 1350 of the hearings. The revised descriptive summary will be included in the record.

(The information follows:)

FISCAL YEAR 1973 R.D.T. & E. ADDENDUM DESCRIPTIVE SUMMARY

RELIABILITY & MAINTAINABILITY INITIATIVE

Project.—R41ZZ Reliability & Maintainability Initiative.

Background.—The life cycles of weapon and equipment systems can and are being examined for ways to reduce the cost of ownership. The cost of operation contains recurring expenditures which can be reduced by carefully selected improvement programs. A modest investment in component improvement which increases the mean time between failure (MTBF) can produce a reduction downstream expenditures in maintenance funds and manpower while increasing readiness. A joint service effort was initiated by DEPSECDEF/DDR&E during August 1971.

Description.—The Navy program will examine systems to determine their candidacy for improvement and then develop and validate changes, install and test, and upon completion of OT&E, incorporate proven fixes into the weapons, training and support systems.

Related activities.—Specific equipment and system programs for selected system coordinated by the Chief of Naval Development.

Work performed by.—Contractors and Navy project offices responsible for each specific equipment, Navy laboratories and development activities. Westinghouse, Baltimore, Maryland for AWG–10.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS

Fiscal year 1971 and prior accomplishments.—Not funded.
Fiscal year 1972 program.—Not funded in FY 1972.
Fiscal year 1973 planned program.—Selection will be made of qualified deployed systems as candidates for improvement in reliability and/or maintainability. AN/AWG–10 system is under consideration as a candidate.
Program to completion.—This will be a continuous program with identification of equipments and systems as candidates for this effort.
Amendment category.—Programs to attack the high cost of weapons through less costly design and improved maintenance and reliability.

RESOURCES

[In thousands of dollars]

	Fiscal year—			Additional to completion	Total estimated cost
	1971 and prior	1972	1973		
R.D.T. & E., N.:					
Basic	0	0	5 000	Undetermined	Not available.
Amendment			5, 800		
Total			10, 800		

CLOSE-IN WEAPONS SYSTEM

Dr. FROSCH. The final item in the request is for $5.8 million to expand a new project in which we propose to develop approaches to the solving of general problems of reliability and maintainability much in the same way as I just described for the close-in weapons system.

We plan to select deployed systems based upon their inadequate reliability and excessive maintenance costs and determine the most cost effective method to reduce costs and increase reliability.

The project would provide for developing the required changes and installing and testing the changes under operational conditions. The sooner we get started on this, the less we will spend on avoidable operating costs.

We have selected the AN/AWG–10 airborne radar, the 1200 p.s.i. steam propulsion plant and several other systems as initial candidates for investigation under this project.

This concludes my prepared remarks, Mr. Chairman.

I am ready to answer any questions you or the committee may have.

CONTINUING PROGRAMS

Senator YOUNG. As we were going through the justifications on each of the requested increases I concluded that your budget amendment does not include any funds for the initiation of any new programs—they all involve increases for programs for which funds are requested in the original fiscal 1973 budget. Am I correct about this?

Dr. FROSCH. That is correct, Senator Young. Our amendment does not include funds for any program not included in the original 1973 budget request.

AMENDMENT SUMMARY

Senator YOUNG. The summary tabulation appended to your statement listing each of the projects included in the amendment will be included in the record.

(The information follows:)

R.D.T. & E.N. FISCAL YEAR 1973 BUDGET AMENDMENT

[In millions of dollars]

Program (project)	Fiscal year 1972 presently available	Fiscal year 1973 budget	This amendment	Justification book page No.
ULMS	104.8	520.4	35.0	62
Space technology (749)	[Deleted]	[Deleted]	10.0	65
Antiship weaponry (harpoon)	36.5	58.3	2.0	56
Cruise missiles:				
Encap Harpoon	2.7	14.0	2.0	50
Advanced missiles	7.3	2.0	2.0	53
A-6 squadrons (A-6E TRAM)	1.5	4.4	1.8	46
A-7 squadrons (A-7E TRAM)	.5	3.6	2.2	48
S/L weaponry system technology (CIWS)	11.6	8.9	3.0	60
Reliability and Maintenance	0	5.0	5.8	67

Note: Funds are shown at project level.

ULMS FUNDING PROGRAM

R. & D. ULMS Effort

Senator Young. It is my understanding that the additional $35 million requested for the ULMS program is for an acceleration of work on the submarine.

Dr. Frosch. Yes, sir.

Senator Young. In order that the record will be completed I wish you would comment on the funding for the major components of the ULMS system in the 1972 program and the revised 1973 request.

Mr. Frosch. I wonder if I might ask Admiral Lyon to respond.

1972 R. & D. on ULMS

Admiral Lyon. Mr. Chairman, the $104.5 million for 1972 is split up with about $65 million going into the development of the new missile. That missile can also be backdated on our current Poseidon submarines—$39 million goes into the actual research and development for the submarine components. The majority of that into the development of a new reactor propulsion plant, [deleted] reactor that is necessary for this size ship. About $1.5 million into a command and control radio room to allow this ship to communicate with the national command authority under the strategic system.

1973 R. & D. on ULMS

In the research and development for the fiscal year 1973 budget we have requested $250 million, [deleted] for the submarine and submarine support systems for that missile—$104 million goes into the development of the submarine, itself.

This would finance the completion of the development of the reactor plant, the development of the propulsion equipment, contract design and submarine support systems.

CHANGE IN 1972 PLANS

We had planned in fiscal year 1972 under the accelerated program for a $35 million extra effort, of which about $9.8 million was to go into the development of missile support systems and $25 million into the development of submarine subsystems. When that supplement was turned down and it came in as a budget amendment, we re-examined our budget and found that we could no longer use the $10 million in the missile support systems but we could use it in trying to gain back some of the time loss on the submarine systems.

UTILIZATION OF $35 MILLION REQUEST

So that $35 million that we are requesting under this budget amendment goes into the development of sonar equipment for this ship, $1.1 million. It goes into test and evaluation, primarily fabrication and mockups and procurement of components and land based evaluation facilities, $1.6 million.

Development of components for the propulsion plant, mainly low-speed reduction gear which we had planned to do earlier and the design of the main propulsion turbines is $3.7 million.

Ship design [deleted] is $4.3 million.

An engineering development model of command control integration aboard the ship is $3.5 million.

Integrated development of an integrated logistics system is $1.1 million.

Development of the integrated radio room is $3.3 million.

Evaluation of alternate refit facility and industrial concepts for support of the submarine is $11.4 million.

A reduction in submarine observables to increase the survivability of the submarine and the development of prototype equipment for the missile tube, 400-cycle power supplies, main storage battery for the submarine, oxygen generators and atmosphere control equipment and the design and engineering of an internal information transfer system.

COST OF NEW MISSILE SYSTEM

Senator YOUNG. Do you have an estimate of the amount of research and development money that will be used to develop the new missile system and the new submarine?

Admiral LYON. Yes, sir. We have provided to the committee a book that summarizes all of the information, all of the dollars, and breakdown for them. I can give you the totals on that.

The total research and development for the missile is [deleted]. That is for the ULMS–1 missile.

COST OF ULMS SUBMARINE

Senator YOUNG. How much for the submarine?

Admiral LYON. For the submarine, a total of [deleted]. That includes the development of the reactor plant and all of the necessary systems in the new submarine.

Senator YOUNG. Thank you. That is very helpful.

(Whereupon, the subcommittee proceeded to other business.)

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