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DEPARTMENT OF DEFENSE  
**Semiannual Report**  
of the  
**SECRETARY OF DEFENSE**



and the  
**SEMIANNUAL REPORTS**  
of the  
**SECRETARY OF THE ARMY**  
**SECRETARY OF THE NAVY**  
**SECRETARY OF THE AIR FORCE**  
**January 1 to June 30**  
**1957**

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UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1958

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UNITED STATES GOVERNMENT  
WASHINGTON, D. C. 20301

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**Letter of Transmittal**

THE SECRETARY OF DEFENSE  
WASHINGTON

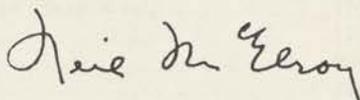
MAY 5, 1958

DEAR MR. PRESIDENT :

In compliance with Section 202 (d) of the National Security Act of 1947, as amended, I submit the semiannual report of Secretary of Defense Charles E. Wilson, together with those of the Secretaries of the Army, the Navy, and the Air Force.

By arrangement with the Chairmen of the Senate and House Armed Services Committees, the midfiscal year reports presented the activities of the defense establishment mainly in statistical form, with the understanding that a comprehensive report would be submitted after June 30, 1957. In line with this agreement, the enclosed reports cover activities for the entire fiscal year 1957.

With great respect, I am  
Faithfully yours,



NEIL McELROY

THE PRESIDENT  
THE WHITE HOUSE

Letter of Transmittal

The Honorable

Chairman

Washington

I am pleased to inform you that the report of the Commission on the Administration of the Federal Government, which was prepared by the Commission on the Administration of the Federal Government, is being transmitted to you for your information. The report is being transmitted to you in the form of a letter of transmittal, which is being prepared by the Commission on the Administration of the Federal Government. The report is being transmitted to you in the form of a letter of transmittal, which is being prepared by the Commission on the Administration of the Federal Government.

Very truly yours,  
Chairman

*John F. Kennedy*

John F. Kennedy

The President  
The White House

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## I. Introduction

During fiscal year 1957 our armed forces continued to increase their combat capabilities as new and more effective weapons were delivered to field units in greater numbers. Better training and equipment improved the readiness of our reserve establishment. Our allies, with military assistance from the United States, continued to build collective strength for the common safety. Progress in all these fields was made without adversely affecting the economic health of our country.

Careful reviews of military programs assured that our armed forces were properly balanced to meet the challenges of the cold war, the threats of limited aggression, and the dangers of total nuclear war. While the forces-in-being were equipped with the most modern weapons available, provisions were made to develop even more effective weapons for the forces-to-be, in order to enable them to carry out their missions successfully 3, 5, and 10 years from now.

The need to prepare simultaneously for present and future dangers and for all types of aggression is the major factor accounting for the high cost of security. A heavy additional burden is added by the constantly rising cost of modern arms, brought about by the greater complexity of these weapons and by general price and wage increases.

In these circumstances, maximum economy and efficiency in all operations become vital to our national security. Competing programs must be carefully evaluated for their relative priority, and, whenever possible, credit must be taken in numbers of men and units for the increased combat power of modern weapons.

The 1957 programs of the Department of Defense were implemented in accordance with these principles. The armed forces adjusted their combat organization and tactical doctrines to take maximum advantage of technical advances. Ballistic missile research and development were pursued with the highest priority. Administrative steps were taken to reduce overhead, to increase the proportion of men serving in combat units, to retain trained and qualified personnel in larger numbers, to improve the efficiency of supply operations, and to provide better financial controls.

As a result, our armed forces possessed greater combat strength on June 30, 1957, than ever before. Existing programs assure that this strength will continue to increase in the years ahead. Expenditures for military security remain high, and rising costs place increased

emphasis on the timely adjustment to modern weapons systems while retaining for our armed forces sufficient flexibility to meet military aggression in whatever form it may occur.

Such adjustments, wisely chosen and properly timed, represent the key to the future security of our country and to its economic welfare.

### **The Armed Forces**

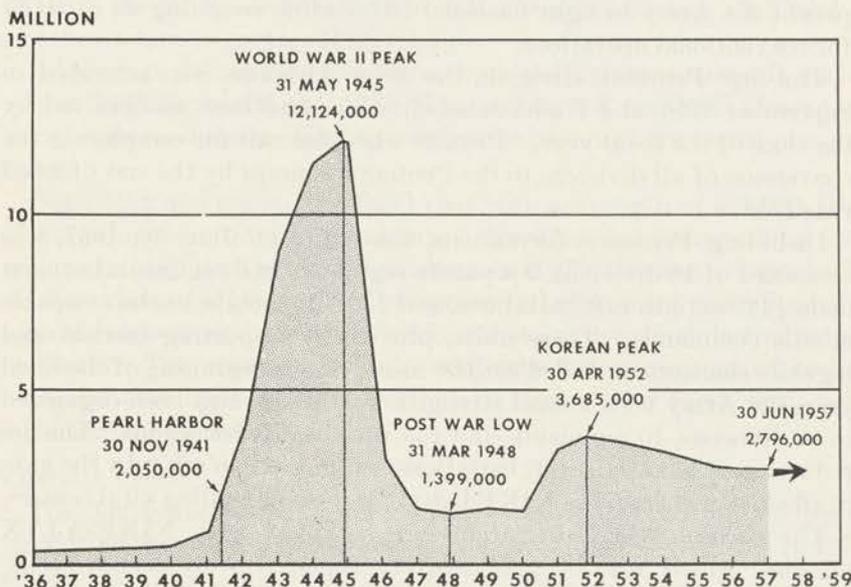
During fiscal year 1957, modern technology gave our armed forces ever-improving means to deter aggression. Combat units were modified to reflect the greater striking power and longer range of modern weapons, the increased mobility of present-day forces, and the improved communications equipment now available.

Overall force levels remained almost constant. At the beginning of the fiscal year military personnel on active duty numbered 2,806,000. At the close of the fiscal year, the active forces totaled 2,796,000 (fig. 1). Of the active forces, 63.4 percent were assigned to the operating forces, compared to 57.4 percent on June 30, 1953, and 62.7 percent on June 30, 1956. Over 41 percent were stationed abroad or with the operating forces of the Navy, afloat or mobile.

The development of new weapons and of new strategic concepts led to a clarification of the roles and missions of the military Services by the Secretary of Defense on November 26, 1956. The existing roles and missions statement, as approved in 1948 and slightly modified in 1953, was accepted without basic changes, but within this framework five specific problem areas were clarified:

- (1) In regard to intermediate-range ballistic missiles, sole responsibility for the operational employment of the land-based version was assigned to the Air Force and of the ship-based version to the Navy.
- (2) In the air defense missile field, the Army was directed to develop, procure, and operate missile systems for the "point" defense of vital centers, ranging outward as far as 100 miles, and the Air Force was given similar responsibilities for "area" defense, or for the interception of attacks remote from, and without reference to, vital centers.
- (3) As for tactical air support, the Army was authorized to continue its development of surface-to-surface missiles—with a range of about 200 miles—for the close support of troops, while the Air Force was directed to provide the tactical air support required in addition to that furnished by Army missiles.
- (4) Reexamination of the requirements for airlifting tactical units and supplies indicated that adequate airborne lift was available to meet currently approved strategic concepts.
- (5) The functional responsibilities of the Army and the Air Force for operating aircraft in combat zones were restated, clarifying the

## TOTAL MILITARY PERSONNEL



Based on June 30 Figures

Figure 1.

Army's tactical aviation program. This restatement was issued as a separate directive in somewhat greater detail on March 18, 1957—replacing the November 4, 1952, memorandum of understanding of the Secretaries of the Army and Air Force relating to the Army's organic aviation.

These guidelines should improve the overall effectiveness of our armed forces, avoid unnecessary duplication, and make the best possible use of available funds. Additional clarifications will be issued as necessary to assure the most effective integration of new weapons systems into the military establishment.

### *The Army*

The Army began to reorganize and reequip its major combatant units as Pentomic divisions during the fiscal year. Smaller and lighter than the traditional triangular division, the reorganized division is composed of 5 highly mobile combat groups organically supported by 5 batteries of light artillery and 1 battery of HONEST JOHN rockets, which can be armed with either high explosive or nuclear warheads. Pentomic divisions possess greater flexibility, smaller numbers of men with a larger proportion of frontline fighting

strength, and lighter equipment for greater mobility. They will permit the Army to fight nuclear battles while retaining its capacity for conventional operations.

The first Pentomic division, the 101st Airborne, was activated in September 1956, and 7 additional divisions had been reorganized by the close of the fiscal year. Present schedules call for completing the conversion of all divisions to the Pentomic concept by the end of fiscal year 1958.

Including Pentomic formations, the Army on June 30, 1957, was composed of 18 divisions, 9 separate regiments and regimental combat teams, 119 antiaircraft battalions, and 2 highly mobile, nuclear-capable missile commands. These units, plus their supporting tactical and logistics elements, included 998,000 men. At the beginning of the fiscal year, the Army with a total strength of 1,026,000 had been organized in 18 divisions, 10 regiments, and 133 antiaircraft battalions. The net reduction of 14 antiaircraft battalions was more than offset by the gain in effectiveness from the NIKE battalions now defending vital centers.

The present NIKE battalions are equipped with NIKE-AJAX missiles, which will be progressively replaced with NIKE-HERCULES—a missile with longer range, greater altitude, and nuclear capability. In addition to HONEST JOHN rockets, the Army has in operational use the surface-to-surface CORPORAL guided missile with a range of over 75 miles.

#### *The Navy and Marine Corps*

On June 30, 1957, the Navy with a strength of 677,000 was operating 967 ships, of which 409 were warships and 558 were other combatant vessels and auxiliaries. Naval air striking power was concentrated in 17 carrier air groups and 20 carrier antisubmarine squadrons, and was supported by 49 patrol, early warning, mining, and reconnaissance squadrons. During the fiscal year, the Navy added 7,000 personnel, 5 warships, and 1 other combatant vessel. It deactivated 12 auxiliaries for a net reduction of 6 ships. Its number of carrier air groups remained the same, but its carrier antisubmarine squadrons and other aerial squadrons were increased by 1 each.

Continued progress was achieved in modernizing the Navy's vessels, weapons, and aircraft. A third 60,000-ton carrier, the *Ranger*, was launched in September 1956 and is scheduled to join the *Forrestal* and *Saratoga*, operating with the fleet, early in the new fiscal year. During fiscal year 1957 the first nuclear-powered submarine, the *Nautilus*, was refueled for the first time after cruising more than 60,000 miles; the second nuclear submarine, the *Seawolf*, was commissioned; and the third, the *Skate*, was launched. Construction began on the first nuclear-powered surface vessel, the guided-missile cruiser *Long Beach*.

The Navy now has five guided missiles of proven effectiveness opera-

tional in the fleet—the surface-to-air TERRIER, the air-to-air SPARROW I, the air-to-air SIDEWINDER, the air-to-surface PETREL, and the surface-to-surface REGULUS.

Additional deliveries of modern, high-performance aircraft such as the A4D Skyhawk, the A3D Skywarrior, and the F8U Crusader have heightened the striking and defensive power of our naval carrier forces.

Beginning and ending the fiscal year with a strength of 201,000, the Marine Corps continued to maintain 3 divisions and 3 supporting air wings at a high level of combat readiness and effectiveness. A gradual readjustment of organizational structure and equipment was initiated, with the objective of creating divisions that are more mobile and more powerful. The reorganized units will take full advantage of technological developments and meet today's demand for light, fast, and self-sufficient forces.

#### *The Air Force*

The Air Force increased its manpower by 10,000 during the fiscal year, from 910,000 to 920,000, and its major units by 6, from 131 to 137 wings.

This 137-wing structure, however, was not quite the same as that envisaged in 1953. Six fighter-type wings, including 1 fighter reconnaissance wing, were cancelled in the intervening years, and 1 light strategic reconnaissance wing, 4 troop carrier assault wings (previously part of the supporting forces), and 1 MATADOR-equipped tactical missile wing were added. Grouped according to the missions to be performed, the Air Force had at the close of the fiscal year 50 strategic wings, 32 air defense wings, and 55 tactical wings—the latter including 15 heavy, medium, and assault troop carrier wings.

In line with the continued trend toward improved weapons, the Strategic Air Command started to reequip its heavy bombardment wings with all-jet B-52's, each wing to include 45 B-52's in place of the 30 B-36's previously allocated. The range of these bombers will be further increased by the use of KC-135 jet tanker-transport, the first of which was delivered to the Strategic Air Command in June 1957. These deliveries are greatly strengthening our strategic striking power both quantitatively and qualitatively.

Similar progress is being made in fighter and interceptor aircraft with the replacement of subsonic jets by supersonic aircraft in the Century-series. Day fighter wings have been completely reequipped with the F-100, and this aircraft is also replacing older models of fighter bombers at a rapid rate. Air-defense interceptor forces now include operational units equipped with the F-102 Delta Dagger.

The interception capabilities of the air defense force have been further improved by deliveries of the highly effective FALCON air-

to-air guided missile and of the SIDEWINDER missile developed by the Navy. The GENIE, a free air-to-air rocket with a nuclear warhead, became operational in January 1957. Substantial improvement was also made during the year in the already operational MATADOR, a tactical pilotless bomber for use against ground targets.

Continued progress in these fields will insure that the Air Force maintains the high level of combat effectiveness required by national security.

#### *Continental Air Defense*

The Continental Air Defense Command, composed of Army, Navy, and Air Force elements, became appreciably better equipped during the fiscal year to destroy potential enemy intruders in the airspace over North America.

Our capability to detect approaching enemy aircraft at maximum range was significantly improved at the close of the fiscal year with the completion on schedule of the main portion of the Distant Early Warning (DEW) line which stretches above the Arctic Circle from western Alaska across Canada to Baffin Island. Further eastern and western extensions of the DEW line have been programmed. Additional warning is provided by the mid-Canada and Pine Tree lines, Texas Towers, radar picket ships operated by the Navy, and early warning aircraft operated by the Navy and Air Force.

For the destruction of enemy attackers, nuclear air defense weapons were developed which provide by far the most effective method of countering enemy air attacks. These weapons include an air-to-air rocket as well as surface-to-air guided missiles adapted to carry nuclear warheads.

The interception of enemy aircraft is being improved by the installation of electronic control systems. The firing of Army missiles is closely coordinated by the MISSILE MASTER, and the latter will operate in conjunction with the Semi-Automatic Ground Environment (SAGE) system being developed by the Air Force to facilitate the tactical direction of the air defense battle.

The continued orderly execution of the established programs should lessen the chance that these weapons will ever have to be used. We are not likely to be attacked as long as the enemy recognizes that his losses will be prohibitive.

#### **The Price of Security**

To maintain adequate defenses within reasonable expenditure limits has become increasingly difficult in recent years because of the accelerating rate of technological progress. Weapons become obsolescent long before they wear out, and their more powerful and more complicated replacements cost on the average two or more times as much as

the original equipment. Maintenance and operating expenses are also rising as more man-hours and higher skills are required to operate and repair modern weapons systems. In addition, increased prices and wages are placing an additional charge on all current activities.

These facts have made it more essential than ever that defense expenditures be constantly redirected to support the programs most vital to our security. Only thus will we be able to provide the necessary security for our country without jeopardizing our way of life or our free institutions.

During fiscal year 1957 the Department of Defense had available \$74.5 billion for the support of military programs. This total included \$36.8 billion in funds newly appropriated by the Congress and \$38.5 billion in unexpended balances carried over from previous years' appropriations, less \$0.8 billion after net transfers and recisions.

The Department of Defense expended \$38.4 billion during the fiscal year—about 7.5 percent more than the \$35.8 billion expended during the previous year. This increase was caused by such factors as the accelerated expenditures for ballistic missile programs, the elimination of production delays, and increased prices, wages, and interest rates. For example, expenditures for ballistic missiles increased from one-quarter of a billion dollars in fiscal year 1956 to about one billion dollars in fiscal year 1957. The wholesale price index rose 2.8 percent during the past fiscal year, while construction costs increased 3.8 percent, shipbuilding costs 7.3 percent, and average gross hourly wages in the durable goods industry 4.8 percent.

The expenditures of fiscal year 1957 continued to reflect the major emphasis being placed on the development of air power. Air Force spending amounted to \$18.4 billion, that of the Navy and the Marine Corps to \$10.4 billion, and that of the Army to \$9.0 billion, while inter-service activities accounted for \$0.6 billion.

Improvements in financial management and in contracting procedures made possible a further reduction in unexpended balances. The amount carried forward into fiscal year 1958 totaled \$35.6 billion, a reduction of \$2.9 billion during the past year. The carry-over in unobligated balances was reduced by \$1.7 billion, or from \$12.3 billion to \$10.6 billion.

In January 1957 the Department of Defense requested new obligational authority from the Congress for fiscal year 1958 in the amount of \$36.2 billion for the regular budget and \$2.1 billion for military construction. The clear intent of the Congress and the country to reduce Federal expenditures, as well as fiscal considerations confronting the Government, led the Department to review its programs and submit revised estimates of \$34.4 billion for the regular budget and \$1.7 billion for construction—a total reduction of \$2.2 billion. A large

portion of this reduction, \$1.3 billion, was achieved by reducing working capital funds and unobligated balances and reserves.

Shortly after the close of the fiscal year, the Congress appropriated \$35.3 billion—\$33.8 billion for the regular Department of Defense budget and \$1.5 billion for military construction. This amount was \$0.8 billion less than the revised estimates of the Department and \$3.0 billion less than its original request.

Under this budget, expenditures for fiscal year 1958 were estimated in the neighborhood of \$38.0 billion—an amount which was also prescribed as a maximum by the statutory debt ceiling enacted by the Congress.

To stay within this amount despite rising costs, a careful review of all programs was initiated toward the close of the fiscal year with a view toward eliminating, reducing, or postponing expenditures for lower priority projects. The basic principle of this review was to bring the expenditures for fiscal year 1958 in line with the budget estimates to the extent that this could be done without impairing vital elements of our military strength. The maintenance of adequate defenses will determine this time, as it has in the past, the final expenditure total for fiscal year 1958.

### **Organization and Management**

The Department of Defense continued to operate during fiscal year 1957 in accordance with the policies prescribed in the National Security Act of 1947, as amended—providing for three military departments “separately administered” and for “their authoritative coordination and unified direction under civilian control” (fig. 2).

Under this organization, policy formulation is vested in the Secretary of Defense who, in carrying out his task, draws upon the views of the Secretaries of the military departments, the functional advice of the Assistant Secretaries of Defense, and the military recommendations of the Joint Chiefs of Staff. The supervision of operational activities is the responsibility of the Secretaries of the military departments. Given the organizational framework established by law, centralized policy direction and decentralized administration of operations is essential to the effective management of an organization as large as the Department of Defense.

An organizational change was made in the Office of the Secretary of Defense on February 25, 1957, when the offices of the Assistant Secretaries for Research and Development and for Engineering were amalgamated under a single Assistant Secretary of Defense (Research and Engineering). This regroupment of functions established a more tightly-knit organization for the coordination and evaluation of research, development, and engineering programs and brought the administrative structure of the Office of the Secretary of Defense

DEPARTMENT OF DEFENSE  
OFFICE OF THE SECRETARY OF DEFENSE

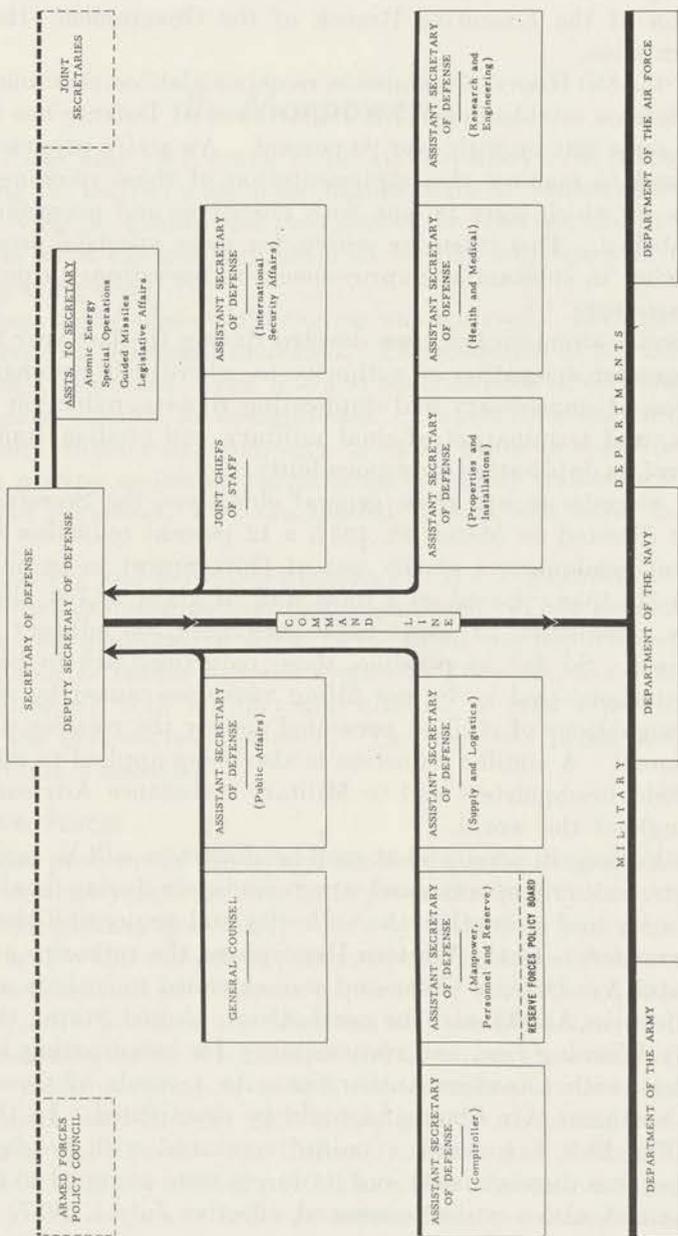


Figure 2.

into closer alinement with that of the military departments. A similar adjustment had been recommended by the Commission on Organization of the Executive Branch of the Government—the Hoover Commission.

Of the 350 Hoover Commission recommendations that touched upon the defense establishment, the Department of Defense has concurred with some 320, or with over 90 percent. An active program is being pursued to monitor the implementation of these recommendations, many of which were in line with objectives and programs already established. This intensive search for more effective procedures is resulting in substantial improvements in operations throughout the Department.

Special attention has been devoted during the last year to achieving greater delegation of authority to subordinate commands, elimination of unnecessary and duplicating reports, reduction in paperwork, and termination of dual military and civilian staffing when it involves duplication of responsibility.

In accordance with these general objectives, the Secretary of Defense directed on March 18, 1957, a 12 percent reduction in departmental headquarters at the seat of Government to be achieved by June 30, 1958. Based on a total staff of about 53,700, this will involve a reduction of about 6,300 persons—1,700 military and 4,600 civilians. So far as possible, these reductions are to be achieved by attrition—that is, by not filling vacancies caused by retirements or resignations of civilian personnel and by the rotation of military personnel. A similar reduction is also being applied to selected major field headquarters and to Military Assistance Advisory Groups throughout the world.

Reductions in personnel at such headquarters will be facilitated by the streamlining of command structures begun during fiscal year 1957 to clarify and strengthen the authority and responsibilities of major commanders. In the Western Hemisphere, the authority of the Continental Air Defense Command was extended to include air defense facilities in Alaska and the northeastern United States, the Distant Early Warning line, and responsibility for coordinating air defense matters with Canadian authorities. As a result of these changes, the Northeast Air Command could be deactivated. In the Pacific, the Far East Command, a unified command with headquarters in Tokyo, was disestablished and its forces were assigned to the Pacific Command, also a unified command, effective July 1, 1957.

## **II. Manpower**

During fiscal year 1957, major emphasis continued to be placed on maintaining the active forces in the highest state of combat effectiveness, improving the quality and readiness of the reserves, and providing for the more efficient utilization of civilian employees in their many supporting roles.

In all these fields substantial progress was achieved. Reenlistment rates for regular personnel increased. The readiness of the reserve forces greatly improved. The role and contributions of civilian employees became steadily more significant. Despite these encouraging developments, further improvements must be made as scientific advances are placing an increasing premium on highly trained military and civilian personnel, who are needed in numbers never before required.

The manpower and personnel programs of the Department of Defense have been designed to meet this urgent need. They provide for qualitative and quantitative adjustments to fit the requirements of present as well as future weapons systems. They aim to encourage capable personnel, both military and civilian, to seek a permanent career in the defense establishment. The vigorous prosecution of these programs is essential.

### **The Active Forces**

The major problem in the manpower field confronting the armed forces for several years has been to improve the quality and experience level of military personnel. Only by attracting and retaining the most capable and competent personnel can the armed forces maintain the readiness and effectiveness required for our national security.

To resolve this problem, the Congress and the Department of Defense carried out a series of legislative and administrative actions over the last 3 years designed to reduce the excessive turnover among military personnel. In July 1954 a law greatly increasing reenlistment bonuses was passed. The Career Incentive Act of March 1955 provided selective pay raises, particularly for noncommissioned officers and junior officers in order to induce them to remain on active duty. The Dependents' Medical Care Act of May 1956 extended more adequate medical care to the dependents of all military personnel. The Armed Forces Regular Officer Augmentation Act of July 1956

increased career security in the officer corps. The Servicemen's and Veterans' Survivor Benefits Act of August 1956 raised such benefits in general and made them more equitable, besides placing the members of the armed forces under the Social Security system. In addition, legislation was approved annually permitting the construction of additional family housing urgently needed in the United States and overseas.

These measures greatly helped to raise retention rates from their dangerously low levels of 1954 and 1955, but so far have failed to bring these rates to the sustaining levels required for the maximum readiness of our armed forces.

The size of the problem confronting the Department of Defense is indicated by the personnel losses suffered annually by the armed forces. These amounted in fiscal year 1955 to 1,156,000 or 35 percent of the military personnel strength at the beginning of the year, in fiscal year 1956 to 802,000 or 27 percent, and in fiscal year 1957 to 674,000 or 24 percent. To replace the men lost in fiscal year 1957 and maintain the approved force levels, the armed forces had to obtain from civil life a total of 663,000 men, of whom 30,000 were officers, 93,000 reservists beginning tours of active duty, 179,000 Selective Service inductees, and 361,000 men enlisting for the first time or reenlisting from civil life.

The number of persons required from civil life during fiscal year 1957 would have been about 100,000 more if the low reenlistment rates of fiscal year 1954 had still been prevalent. This rate stood at 23.7 percent in fiscal year 1954 for the regular personnel eligible, increased slightly to 27.2 percent in fiscal year 1955, and rose to 43.6 percent in fiscal year 1956 and to 45.9 percent in fiscal year 1957 (fig. 3). This improvement over a 4-year period has saved in the past year alone about \$320 million—the training cost of the additional 100,000 men that would have been required—and contributed greatly to the combat effectiveness of the armed forces.

While the progress made has been most encouraging, it still falls short of requirements. This fact becomes evident when reenlistments are broken down into types of reenlistment and skill categories. In the first place, inductees are not included in the above percentages; their reenlistment rate averages around 3 percent and probably cannot be increased substantially. Secondly, while the reenlistment rate for all regulars was 45.9 percent in fiscal year 1957, it was only 24.7 percent for "first termers" as compared to 85.8 percent for "career" regulars. In other words, more than three-quarters of those having entered the armed forces relatively recently decided to return to civilian life. And finally, among the "first term" reenlistments the rates for the critical technical skill categories, such as electronics, continued considerably below the 24.7 percent average, while those for

**REENLISTMENT RATES**

FISCAL YEARS 1955 - 1957

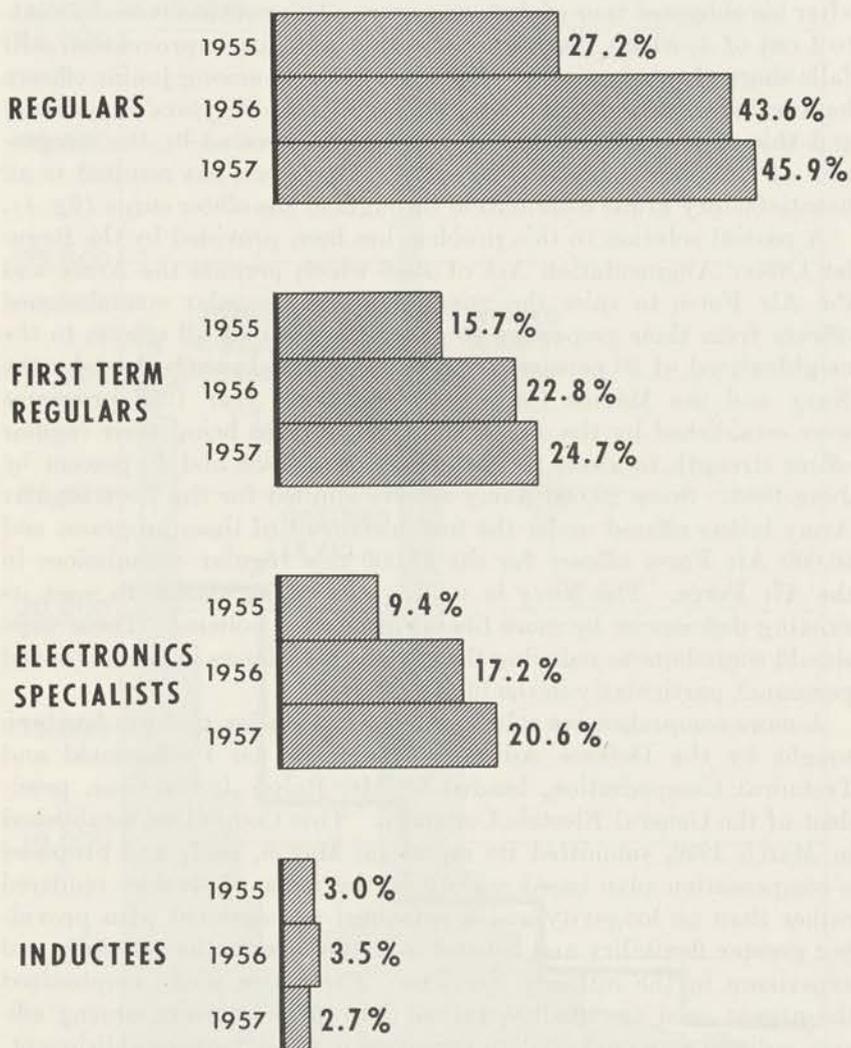


Figure 3.

the nontechnical administrative and service skills accounted for much higher percentages. This situation is cause for serious concern in view of the constantly increasing technical complexity of modern weapons systems.

As for officer personnel, the armed forces face as their major problem the retention of increased numbers of capable junior officers. In 1954 and 1955 only 1 out of 6 of the younger officers continued in service after his obligated tour of duty was over. This rate has recently risen to 1 out of 4, which, despite constituting a major improvement, still falls short of requirements. The high loss rate among junior officers has created a major deficit among officers with 3 to 12 years' experience, and this deficit, combined with the "hump" created by the integration of a large number of World War II officers, has resulted in an unsatisfactory grade distribution throughout the officer corps (fig. 4).

A partial solution to this problem has been provided by the Regular Officer Augmentation Act of 1956 which permits the Army and the Air Force to raise the number of their regular commissioned officers from their respective 26 and 18 percent of all officers to the neighborhood of 50 percent—a percentage already authorized for the Navy and the Marine Corps. During fiscal year 1957 programs were established by the Army and Air Force to bring their regular officer strength to about 35 percent by June 1958 and 40 percent by June 1963. Some 22,000 Army officers applied for the 7,000 regular Army billets offered under the first increment of these programs and 60,000 Air Force officers for the 25,000 new regular commissions in the Air Force. The Navy is seeking special legislation to meet its existing deficiencies by more liberal promotion policies. These steps should contribute to reducing the current high losses in commissioned personnel, particularly in the junior grades.

A more comprehensive solution to the qualitative problem has been sought by the Defense Advisory Committee on Professional and Technical Compensation, headed by Mr. Ralph J. Cordiner, president of the General Electric Company. This Committee, established in March 1956, submitted its report on May 8, 1957, and proposed a compensation plan based mainly on the value of services rendered rather than on longevity and a personnel management plan providing greater flexibility and control over the distribution of skills and experience in the military Services. The entire study emphasized the urgent need for quality, rather than mere numbers, among officers, enlisted men, and civilian personnel in the defense establishment. The Committee concluded that the adoption of its proposals would improve combat capabilities by 15 percent, reduce military manpower requirements, and produce savings and gains that might more than offset the added costs within 4 or 5 years.

## DISTRIBUTION OF OFFICERS BY YEARS OF SERVICE CREDITABLE FOR PAY DECEMBER 1956

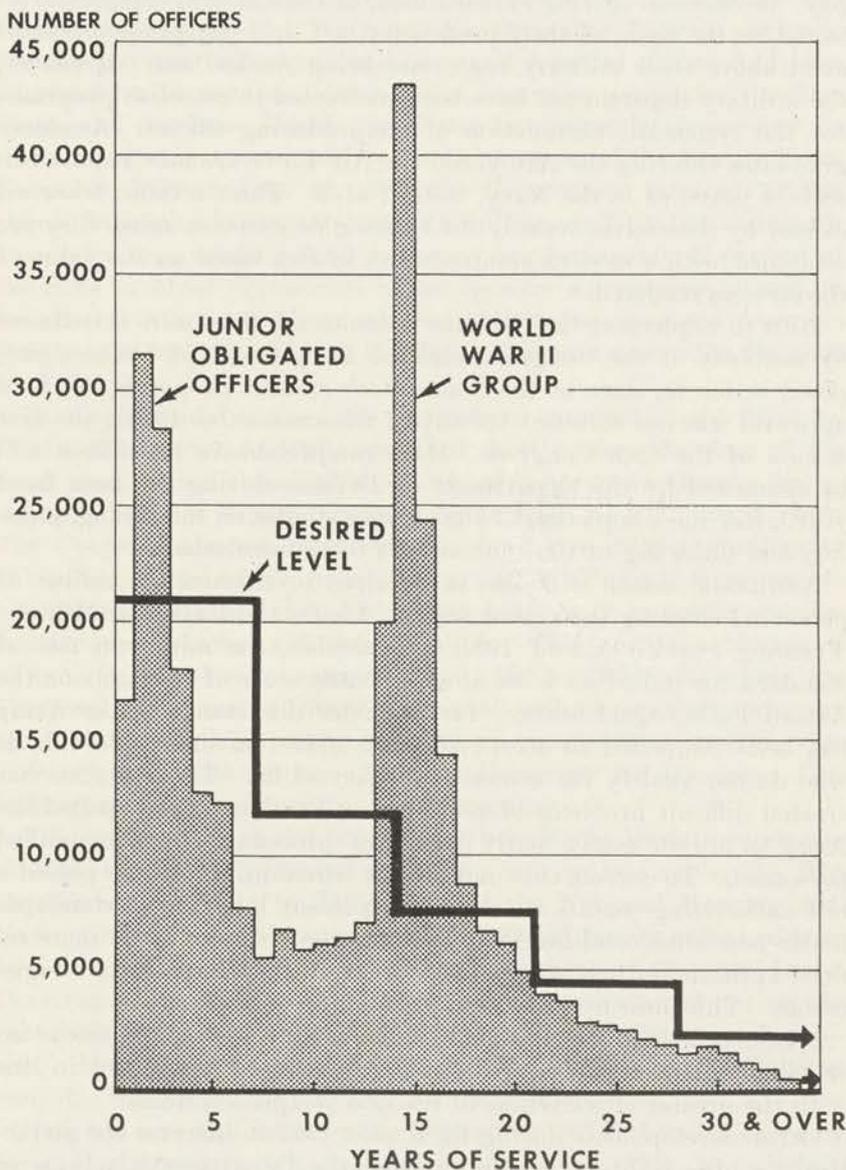


Figure 4.

The Department of Defense has given its general approval to the Cordiner Committee's proposals and has initiated additional studies on the timing, phasing, and financing of the recommendations—problems not covered in the Cordiner report.

Some of the personnel management proposals of the Committee have already been initiated. Details for establishing "proficiency pay" increments—giving enlisted men, in critical skill categories, selected on the basis of their proficiency, a 1 or 2 pay-grade advancement above their military rank—are being worked out. Moreover, the military departments have been instructed to establish programs for the systematic elimination of nonproducing officers. Academy graduates entering the Army and the Air Force are now required to serve 4 years, as in the Navy, instead of 3. These actions, however, cannot by themselves remedy the existing deficiencies unless they are combined with a modern compensation system based on the value of the services rendered.

Bills to implement the Cordiner recommendations were introduced by members of the Congress, and the Department of Defense proposed action on some of the Committee's specific proposals, but final approval was not obtained for any of these measures during the first session of the 85th Congress. More comprehensive legislation will be sponsored by the Department of Defense during the next fiscal year, after the completion of the current studies on the timing, phasing, and financing of the Committee's recommendations.

Additional action will also be required to improve the caliber of personnel entering the armed forces. Under the Universal Military Training Service Act of 1951, as amended, the minimum mental standard for induction is set at a percentile score of 10 points on the Armed Forces Qualification Test. Under this standard, the Army has been compelled to accept through induction many individuals who do not qualify for essential military skills. This situation has created difficult problems of personnel utilization and compelled the Army to initiate costly "early discharge" procedures for nonqualified personnel. To correct this undesirable situation, the House passed a bill authorizing modifications of the present low mental standards under peacetime conditions and enabling the Army to apply more refined aptitude-testing procedures in screening Selective Service registrants. This measure is awaiting action in the Senate.

Measures to improve the quality of military personnel become increasingly important as force levels are adjusted downward in line with the greater effectiveness of the new weapons systems.

Other developments during fiscal year 1957 to increase the attractiveness of a military career included the Department's actions in connection with the implementation of the Dependents' Medical Care Act of 1956 and the construction of additional family housing.

The Dependents' Medical Care Act was designed to make medical treatment available to the dependents of all servicemen, nearly 40 percent of whom did not receive this traditional benefit in recent years because of distance from military medical facilities, overburdened Service hospitals, or the unavailability of the necessary treatment. On October 18, 1956, a joint directive governing the operation of the new program was issued by the Secretaries of Defense and Health, Education, and Welfare. By December 7, 1956, contracts for the payment of physicians' fees and hospital claims had been negotiated with state medical societies, insurance companies, the Blue Cross, and the Blue Shield. In States not immediately covered by contract, all claims were paid by the Department of the Army. From December 1956 to June 30, 1957, the Department received 127,902 claims from physicians, totaling \$8.8 million, and 103,595 claims for hospitalization, totaling \$10.7 million. Approximately 42 percent of the cases involved dependents whose sponsor was serving abroad, at sea, at a military school, or who was otherwise separated from his family—the very group that the legislation was especially designed to assist.

In the field of housing, the Congress authorized in the Military Public Works Act of 1957, approved shortly after the close of the fiscal year, an additional 2,000 sets of public quarters, thereby bringing to a total of 34,400 the units authorized over the last 4 years. The Congress also extended through fiscal year 1959 the authority of the Secretaries of the Army, Navy, and Air Force to lease private housing near military installations for assignment as public quarters to military personnel and their families. The maximum number of units to be leased was increased from 3,000 to 5,000. Moreover, the Congress authorized military personnel with dependents, who are assigned substandard public quarters, to occupy these dwellings on a rental basis without loss of basic allowances for housing. This measure corrected an inequity of long standing.

The construction of military family housing by private enterprise through Government-insured mortgages was authorized by the 1955 Capehart amendment to Title VIII of the National Housing Act. Under this program, the construction of 89,000 family units had been approved by June 30, 1957, since the enactment of the amendment. Construction on nearly 31,000 of these units was started during the past year despite the scarcity of private funds to finance such projects. At the request of the Department of Defense, the Congress extended this program by 1 year, to June 30, 1959.

Progress was also made by the Department of Defense in carrying forward the program, authorized on August 7, 1956, to purchase family housing constructed by private enterprise under the old Title

VIII of the National Housing Act, the Wherry amendment of 1949. Directives assigning responsibilities for the acquisition of Wherry housing and procedures to be followed in negotiating for the purchase of such projects were issued. At the close of the fiscal year, 846 units had been acquired and negotiations involving the purchase of 36,600 units had been started.

Construction in foreign countries of family housing financed through the sale of surplus agricultural commodities for local currency has proved a valuable asset in meeting urgent requirements. Contracts for nearly 5,900 units, involving the dollar equivalent of \$82 million, have been concluded and projects for an additional 4,000 units have been approved. This type of contract is being employed in the United Kingdom, France, Italy, Spain, Morocco, Japan, the Philippines, and Bermuda.

Serious deficiencies in military housing still exist, particularly at remote installations. Moreover, the introduction of new weapons systems, requiring new installations, is constantly creating additional needs for public quarters. Since the lack of adequate housing is frequently cited by those leaving military service as the major factor in their decision, further construction in the years ahead is urgently needed to assist in retaining experienced and competent personnel in the armed forces.

Advice and assistance by the Defense Advisory Committee on Women in the Services helped to assure improved utilization of the special skills and talents that can be contributed by women in the armed forces. Special attention was devoted to measures providing better housing conditions for women and to the development of additional career incentives for nurses and medical specialists. At the close of fiscal year 1957, 32,200 women were serving on active duty, as compared to 33,600 a year earlier. The 1957 total included 11,700 in the Army, 7,700 in the Navy, 1,600 in the Marine Corps, and 11,200 in the Air Force. Of these, 2,300 were women officers, 8,900 nurses and medical specialists, and 21,000 enlisted women.

Actions taken in recent years to assure the full integration of Negro personnel in the armed forces form part of the broad program of the Department of Defense to seek qualitative improvement by taking full advantage of all available skills. Existing directives have established the general policies to be followed, but these directives cannot, by their very nature, foresee the many varied problems that may be encountered. To resolve such problems, attention continued to be focused during fiscal year 1957 on actions to promote equality in the selection, training, and assignment of all military personnel. Measures of this type help to make possible the fullest utilization of the total manpower resources of our Nation.

The joint information and education programs of the military departments represent another major effort to raise the qualitative level of military personnel. In the information field, 34 pamphlets and folders were prepared during fiscal year 1957 for use by the various Services, involving a distribution of 17,000,000 copies. Weekly clip-sheets and mat press services were furnished to 1,600 military and civilian newspapers. Nearly 700,000 posters were distributed. Materials provided by the defense establishment accounted for 70,000 recorded program hours over 23 television outlets and for nearly 500,000 such hours over 157 radio outlets. The subjects discussed in the various media included such matters as the rights and duties of citizenship, the threat of Soviet communism, the benefits of a Service career, the Code of Conduct, and the missions of the armed forces.

In the educational field, the United States Armed Forces Institute at Madison, Wis., provides materials and services for military personnel all over the world. Courses are offered at the elementary, high school, and college levels by correspondence, self-teaching, and group-study methods. During fiscal year 1957 the number of students completing these courses substantially increased. The participating college program, under which 44 colleges and universities provide correspondence courses for military personnel by contract with the Institute, increased its enrollment by about 11 percent.

In line with the Federal Voting Assistance Act of 1955, representatives of the Department of Defense worked with state officials to assist them in drafting amendments to their absentee voting laws reflecting the recommendations of the 1955 act. More than 30 states changed their laws, while the remaining ones are considering liberalizing legislation or are working toward constitutional amendments permitting such changes. The special effort of the Department to encourage the exercise of voting rights in the 1956 election brought out 660,000 votes, or 35 percent of the 1,900,000 eligible servicemen. This record compares favorably with the approximately 15 percent in the 1952 election. With 500,000 more Americans voting in 1956 than in 1952, military personnel accounted for over 60 percent of this increase, or for 300,000 of the additional votes.

The religious and spiritual needs of military personnel were met by 3,200 chaplains on active duty, who conducted nearly 577,000 religious services during fiscal year 1957 with a total attendance of over 34,000,000. A new hymnal for use by all the military Services was compiled, and the Unified Protestant Curriculum for use in military Sunday Schools was further standardized. In support of the character guidance programs that form an important regular feature of military training, chaplains conducted 140,000 lectures and discussion groups attended by 14,000,000 officers and men.

## The Reserve Forces

At the close of fiscal year 1957 the reserve establishment was in a better state of readiness than at any time in our history. The key to the recent progress has been the Reserve Forces Act of 1955.

In accordance with this law, the military units and individual reinforcements required by the active forces in the early phases of a war are assigned to the Ready Reserve. The latter is supplemented by a nonorganized pool of trained personnel—the Standby Reserve—to be recalled as required during the latter phases of a war. The third reserve category is the Retired Reserve, composed of qualified personnel with long experience in the active and reserve forces.

These three reserve categories had a total of 4,011,000 persons enrolled on June 30, 1957—2,818,000 in the Ready Reserve, 1,092,000 in the Standby Reserve, and 101,000 in the Retired Reserve. The Ready Reserve included 379,000 men serving on extended active duty with the Army, Navy, or Air Force, leaving 2,439,000 as emergency reinforcements. Numerically, the reserve establishment showed a slight increase of 95,000 during the fiscal year, but the major improvement of the year was made in the Ready Reserve, the numerical strength of which was reduced by careful screening from 3,663,000 to 2,818,000—a reduction of 845,000.

The screening program was established by the Reserve Forces Act of 1955 in order to insure the immediate availability of units and individuals in a national emergency. It required the screening of the records of over 4,000,000 reservists and the establishment of a system for continuing review in future years. This tremendous task was completed during fiscal year 1957. As a result, 1,388,000 reservists were released from the Ready Reserve—861,000 of these were transferred to other reserve categories and 527,000 were discharged. The majority of those released were personnel who no longer met professional, age, or physical standards for military service or who possessed critical skills in excess of Ready Reserve requirements for such skills. The screening program constitutes a major step forward in building a well-trained and readily available reserve force.

The continued combat readiness of the Ready Reserve is being assured by having a sizable proportion participate in 48 drills a year and in 2-week active duty training programs. On June 30, 1957, 1,000,000 Ready Reservists, over 40 percent of the Ready Reserve not on extended active duty, were maintaining their military proficiency by training in paid drills—an increase of 87,000 as compared to June 30, 1956. Of this total, 260,000 were in the Army Reserve, 422,000 in the Army National Guard, 142,000 in the Naval Reserve, 46,000 in the Marine Corps Reserve, 62,000 in the Air Force Reserve,

and 68,000 in the Air National Guard. About 880,000 took the 2-week active duty training program during the fiscal year.

To improve still further the quality of the reserve forces, the Department of Defense announced on November 26, 1956, that all new accessions to the reserve components would be required to take 6 months' basic training after April 1, 1957. Individuals not having such training will be ordered to active duty or to active duty training within 120 days after enlistment in the reserve program—with certain exceptions being made for high school students aged 17 to 18½ years.

Special provisions were also made for 17- to 18½-year-olds who enlist in the Army National Guard. By a memorandum of understanding negotiated by the House Armed Services Committee on March 5, 1957, such individuals have the option of the current 11-week active duty training program until January 1, 1958. After that date, they as well as all other persons entering the Army National Guard will be required to take the 6-month active duty training program. Over 22,000 National Guardsmen volunteered under this program during fiscal year 1957 and about 5,400 completed their training.

The 6-month active duty training program has proved increasingly popular since its establishment in the fall of 1955. Up to June 30, 1957, 108,000 men—in addition to the National Guardsmen—had enlisted for this program, 73,000 had entered upon training, and 27,000 had completed the course. In addition, some 11,000 commissioned members of the Reserve Officer Training Corps came on active duty for 6 months' training and about 4,600 officers completed their tours. These officers are obligated to serve for 7½ years in a Ready Reserve component.

The steps taken and the programs initiated during recent months will greatly strengthen the effectiveness of the Ready Reserve. Too often in the past Ready Reserve units were compelled to spend much of their limited training periods in schooling the individual recruit. With all reservists having had the same basic training, these units will be able to concentrate their time on improving unit readiness.

Progress was also made in improving training programs, constructing new facilities, and providing additional modern equipment. During fiscal year 1957, \$139.2 million was obligated for reserve construction, an increase of \$53.6 million over the previous year. Of this total, the Air Force obligated \$68.5 million for Air National Guard and Air Force Reserve installations; the Army, \$51.1 million for Army National Guard and Army Reserve armories and other facilities; and the Navy \$19.6 million for Naval Reserve and Marine Corps Reserve projects.

These structures have been designed for maximum joint use by two or more reserve components whenever practicable in accordance with the provisions of the Defense Facilities Act of 1950, as amended. Since the approval of this act, joint utilization has been prescribed at 61 locations, and an additional 272 projects have been approved with the stipulation that planning provide for future requirements of other reserve components. The Congress authorized an additional \$80 million for reserve construction in fiscal year 1958, bringing total authorizations since 1950 to \$580 million. Over \$560 million of this total has been appropriated. With these funds the military Services have made steady progress in providing facilities to stimulate and support effective and attractive reserve training programs.

The new storage and maintenance facilities have made it possible to deliver modern weapons and equipment to reserve units in increasing quantities. Obsolescent items are being replaced as newer models become available in quantities excessive to the needs of the active forces. The Air National Guard received its first deliveries of the rocket-firing F-86D during fiscal year 1957, and the National Guard converted the first of its antiaircraft gun battalions to a NIKE-AJAX guided missile unit. Naval and Marine Corps Reserves, particularly aviation and air control squadrons, also received modern equipment.

The procedures governing the recall of reservists to active duty in a national emergency were outlined in Department of Defense directives issued in January and June 1957. Under these regulations, the number and composition of the Ready Reserve forces to be recalled in an emergency declared by the President are to be determined by the Secretary of Defense with the advice of the Joint Chiefs of Staff. The availability of Standby Reservists in an emergency declared by the Congress is to be determined by Selective Service boards under the direction of the Director of the Selective Service System. Boards are empowered to declare a Standby Reservist unavailable if his recall would result in extreme hardship to his dependents or if his civil activities are considered more essential to the national welfare than his military service.

Despite the substantial improvement in the reserve forces in recent months, continued effort will be required in the years ahead not only to maintain the reserve establishment in a high state of readiness but also to increase its readiness still further. Training programs will have to be improved and adjusted to changing concepts of warfare. Additional facilities and more modern equipment will have to be made available. Most important, a steady influx of experienced personnel, especially enlisted men, will have to be assured if the reserve forces are to fulfill their role as a reservoir of young and trained personnel for whatever emergency may occur.

## Health

The constant improvement in the medical services of the military departments is reflected in the health statistics of our armed forces for fiscal year 1957. The hospitalization rate dropped from 1.06 percent for the previous fiscal year to 1.02 percent, and admissions of military personnel to medical treatment facilities declined from 273.1 per 1,000 to 271.5 per 1,000. This record continues the upward trend in the health of our forces registered over the last 4 years.

The Department of Defense policy to use voluntary means to the largest extent possible for the recruitment of physicians and dentists was considerably furthered with the approval on April 30, 1956, of the Medical and Dental Career Incentives Act, which granted additional pay as well as improved promotional opportunities and other benefits. As a result of this legislation, the adverse trend of the 1954-56 period was reversed. During this 3-year period, losses in the regular medical corps outnumbered gains by a ratio of 2 to 1 and in the regular dental corps by 6 to 5. During fiscal year 1957, only 203 physicians were lost—107 by resignation and 96 by retirement or for other causes—while 740 were commissioned, thereby raising the regular medical corps from 3,308 officers to 3,845. For dentists, the trend has been equally encouraging, as 235 accepted commissions and only 33 were lost, bringing the regular dental corps strength to 1,694 officers at the close of the year. The Department's objective is to raise the proportion of regular physicians and dentists to two-thirds of requirements, which are currently estimated at about 10,500 physicians and 5,600 dentists. Final success in this program would greatly reduce military dependence on civilian professionals as a personnel source.

The residency deferment program, inaugurated in 1954, also proved its value during fiscal year 1957 as an effective means for the recruitment of experienced physicians and specialists. Under this program, young physicians who have completed their internships may request deferment from active duty in order to undertake resident study in medical specialties required in the armed forces. Approximately 2,700 students were thus deferred during the past 3 fiscal years, and about 500 of these trained specialists will enter upon active duty in the summer of 1957. The intake from this program is expected to increase gradually until it levels off in July 1959 at about 900 specialists a year.

Despite these successes, the Department still has to call upon the selective service system to meet the balance of its requirements for physicians and dentists. The necessary authority for such calls has been provided since 1950 by the Doctors Draft Act, under which 10,423 physicians and 4,224 dentists were called to active duty, most

of them during the Korean emergency. During fiscal year 1957, 1,130 physicians were called and no dentists. This legislation expired on June 30, 1957, and was replaced by amendments to the Universal Military Training and Service Act, which made physicians and dentists under the age of 35, who had been deferred from military service, subject to special draft calls until the end of June 1959. It is expected that military needs for medical personnel will continue to be met, as in the past, principally by volunteers, as young physicians and dentists in substantial numbers will volunteer rather than wait for a selective service call at an uncertain date.

To meet the serious shortage of nurses and women medical specialists the Congress enacted shortly after the close of the fiscal year a special career incentive act for nurses, therapists, and dietitians. This legislation established a much improved career pattern by making it possible for greater numbers to reach the permanent grade of major, lieutenant colonel, and colonel or the Navy equivalent. It provided more liberal rules for initial appointment, promotion, and retirement. Its full implementation will involve an additional annual expenditure of almost \$2 million. This new law is comparable in its scope to the 1956 career incentive act for doctors and physicians and is expected to encourage more young nurses and medical specialists to join the armed forces on a career basis.

To promote the efficient construction and use of medical treatment facilities, revised criteria to guide the military departments were developed during the fiscal year. Maximum gross areas for hospitals of various capacities were established, permitting each military Service to adapt its construction plans within these limitations to fit operational and administrative needs at specific locations. Plans for three basic sizes of dental clinics, uniform for all the armed forces, were also completed. Provisions are being made for maximum joint utilization in all new medical construction. During fiscal year 1957, arrangements were completed for such joint utilization by two or more military Services at hospital facilities in the El Paso, Tacoma, and Minneapolis-St. Paul areas.

The formal activation on January 1, 1957, of the Military Medical Supply Agency under the single managership of the Secretary of the Navy is expected to lead to further improvements in the procurement and distribution of medical supplies. The new agency assumed ownership of the wholesale medical supply stock of the three military departments and completed arrangements for taking over the distribution of supplies during the next fiscal year. The single manager concept should permit the reduction of medical supply inventories—particularly of slow-moving items—the curtailment of storage requirements, the elimination of uneconomical cross- and back-hauling

of supplies, and the consolidation of administrative functions. Some benefits of this character have already been achieved and further gains are anticipated as the agency becomes fully operative.

### **Civilian Personnel**

For civilian personnel, the Department of Defense pursued the same objective during fiscal year 1957 as for military and reserve personnel—increased emphasis on quality rather than quantity.

On June 30, 1957, 1,429,000 civilians were employed by the Department of Defense—a reduction of 42,000 during fiscal year 1957. Of the total number employed, 1,161,000 were direct-hire personnel, including 527,000 salaried employees paid according to civil service schedules and 634,000 wage-board employees paid according to local wage rates for their work in shipyards, arsenals, and similar industrial activities. The geographical distribution of these employees showed 1,023,000 within the continental United States, 41,000 in United States territories and possessions, and 97,000 in foreign countries. In addition, 268,000 foreign nationals were employed overseas under contract with local governments.

The problem of attracting and retaining the best qualified civilian personnel was carefully studied by the Cordiner Committee, whose report, issued in May 1957, noted that Federal salaries for professional, technical, and managerial personnel were 15 to 20 percent below the average rate for equivalent jobs in industry. Recommendations of the Committee included the early enactment of an interim pay raise, the removal of legislative limitations on the number of top-level positions, and changes in the statutory Federal pay system designed to introduce greater flexibility in adjusting to industrial pay changes and in recognizing individual worth, particular skills, and difficult and hazardous working conditions.

Support of the objectives of these recommendations was voiced in the Congress and by Government officials. Legislation was proposed to remove the statutory limitations on the top three Civil Service grades and, as an interim measure, to increase the number of such grades as well as top-level scientific positions specifically authorized for the defense establishment, but action on these proposals was not completed during the first session of the 85th Congress. As for increases in civilian salaries, approval of congressional pay legislation was temporarily withheld shortly after the close of the fiscal year, pending a Government-wide review of Federal pay procedures undertaken at the direction of the President.

Within the Department of Defense, established programs to promote the development of career employees continued to be emphasized. Over 1,500 persons participated during fiscal year 1957 in cooperative

education programs under which students can alternate periods of attendance at college with practical work experience at Army, Navy, and Air Force installations. Progress was also made in carrying out the Hoover Commission recommendation to stabilize the tours of duty of military personnel in supply management and to delineate more clearly those managerial positions in support activities requiring primarily civilian skills and those requiring military skills. One of the major objectives of the current studies is improvement in the caliber of managerial personnel.

To improve the utilization of scientists and engineers, programs were established to relieve such personnel of unnecessary administrative work or any subprofessional tasks. Travel policies were broadened to encourage participation in technical, scientific, and professional meetings. Paid advertisements were authorized by the Civil Service Commission as an aid in the recruitment of civilian scientists and engineers.

Some of the most valuable contributions to the operational efficiency of the Department are realized through the Employees Incentive Awards Program, which continued to expand during fiscal year 1957. A total of 242,449 suggestions and inventions was submitted by civilian personnel, almost 15,000 more than during the previous year. Of these suggestions, 66,744 were found acceptable, an increase of almost 3,000. The resultant savings to the Government are estimated at \$64.5 million during the first year. For thus reducing costs, employees were awarded over \$1.3 million. In addition, 431 groups of employees and 24,018 individuals were awarded \$4.5 million for sustained superior performance of duty.

In the overall manpower plans of the Department of Defense, civilian and military personnel are considered as one group. Major contributions to our security are made daily by the civilian employees of the Department, and the programs designed to attract and retain well qualified and dedicated civilians are rated among the efforts vitally important to our national defense. Continued advancement along the lines established and planned is essential.

### **Security Programs**

Vital defense information must be protected against unauthorized disclosure, but judgments have differed and will continue to differ on the specific types of information to be safeguarded and on the protection procedures to be employed. To guide officials as much as possible the Department of Defense has developed over recent years extensive rules for the classification of information and detailed procedures for personnel clearances. The final objective is to assure the proper classification of military information and the handling of

such information by trustworthy persons. Provisions have also been made for the review by higher authority of decisions reached at lower levels.

The Department of Defense system for screening personnel and protecting information has proved a most useful asset in the development of effective national security. While some errors of judgment are inevitable in view of the size and the difficulty of the task, frequent reviews of procedures have kept errors at a minimum. Two such reviews were concluded during fiscal year 1957—one dealing with the safeguarding of classified information and the other with the adequacy of the entire Federal security system.

On August 13, 1956, the Secretary of Defense established a Committee on Classified Information, under the chairmanship of Mr. Charles A. Coolidge, to evaluate existing classification regulations and to examine the available means to prevent the unauthorized disclosure of classified information. In its report, issued on November 8, 1956, the Committee concluded that the established classification system was sound in concept, but it also noted cases of overclassification which, in turn, were partially responsible for making existing regulations less effective in preventing unauthorized disclosures.

The great majority of the recommendations of the Coolidge Committee have been carried out. An Office of Declassification Policy has been created. The number of persons having authority to classify documents has been reduced, particularly for the "Top Secret" category. The numerous directives relating to the safeguarding of information have been combined into a single policy document. More effective procedures for the investigation of unauthorized disclosures and the initiation of prompt corrective actions have been established. As a result, there are fewer shortcomings in the operation of the information security system, and the special attention currently being devoted to this difficult problem should bring further improvements in the years ahead.

On June 21, 1957, the Commission on Government Security, established by the Congress in 1955 under the chairmanship of Mr. Loyd Wright, completed its study of the innumerable laws, Executive orders, regulations, and programs designed to protect our national security. Basic to the Commission's recommendations were the establishment of a Central Security Office as a Government-wide supervisory agency and the separation of the loyalty problem from that of suitability and security in personnel clearances. These and the numerous other proposals of the Commission are being given careful study by all Government agencies, particularly by the Department of Defense which employs nearly 50 percent of the Federal workforce and has over 90 percent of the "sensitive" positions. The results

of this study will be the subject of special legislative proposals at the next session of the Congress.

Improvements in the established security policies and procedures continued to be emphasized during fiscal year 1957 by the military departments and the Office of the Secretary of Defense. Operations improved as responsible officials gained in experience. Special effort was devoted to the selection of the best qualified personnel and to the development of more effective training courses.

In the industrial security field, for example, a revised Manual for Safeguarding Classified Information was issued in February 1957. Additional posters, payroll leaflets, and newsletters were distributed. Industrial security training courses benefited Defense contractors and their security officers as well as Department of Defense personnel. A special conference was held to acquaint union officials with security requirements and procedures.

In carrying out its security programs, the Department of Defense is conscious of the need for protecting the Nation's security interest while, at the same time, safeguarding the rights of individuals and assuring an adequate flow of information to the public. To strike a proper balance between these partially conflicting objectives is an extraordinarily difficult task, especially in a field where judgments rather than detailed regulations necessarily predominate. In these circumstances, close and constant supervision is essential. This type of supervision has been established to provide effective and intelligent administration of the Defense security programs.

### **III. Weapons, Equipment, and Facilities**

The management of military support activities has been greatly complicated in recent years by the rapid acceleration in our technological development. While a large part of the materiel and real estate holdings of the military Services remains essential for military operations, the introduction of new weapons constantly creates new requirements and makes some of the current holdings obsolete. As a result, support activities are in a greater state of flux today than ever before in peacetime.

During fiscal year 1957 the Department of Defense continued to adjust its support management to meet this situation.

Special emphasis on research and development brought new and improved weapons and equipment into operational use at an increased rate. Streamlined procedures were established to speed the completion of high-priority projects.

Interservice supply activities were extended considerably during the year, and the completion of the identification phase of the Federal Cataloging program marked a major step in the establishment of effective management controls.

Careful review of existing installations, proposed construction projects, and maintenance criteria contributed to improved utilization of current real estate holdings, faster disposal of excess property, and more efficient maintenance practices.

While more economical operations during the past year produced substantial savings and helped to absorb increased costs, the basic yardstick for measuring the efficiency of support activities remained—as it must at all times—their contribution to the combat effectiveness of our armed forces.

#### **Research, Development, and Engineering**

Recent years have seen a greatly intensified effort devoted to military research, development, engineering, and testing activities. Planned obligations for these programs amounted to \$5.1 billion in fiscal year 1957 as compared to \$3.8 billion in 1956.

In addition, the Atomic Energy Commission and the NATO Mutual Weapons Development Program expended considerable funds in support of weapons research, while basic and applied research in other Government agencies and in private organizations opened new scientific and technological frontiers.

As a result, our armed forces achieved an unprecedented striking power. Nuclear weapons for the strategical and tactical use of land,

sea, and air units were introduced in increasingly larger numbers. Delivery systems continued to be improved with special emphasis on guided missiles. Our defensive capabilities increased with the development of detection equipment of longer range and greater reliability.

Within the Department of Defense this massive effort was carried on by the research and development agencies of the Army, Navy, and Air Force under the supervision of the Office of the Secretary of Defense. Direct obligations in this field—excluding the indirect costs involved in research construction projects, the pay of military personnel, and the production and testing of prototypes—amounted to \$1.7 billion in fiscal year 1957 as compared to \$1.5 billion in 1956. Expenditures for these years were at the same level.

While guided missile projects received major attention in recent years, the research programs of the military departments necessarily continued to cover a wide range. Of the research and development obligations for fiscal year 1957, 18 percent were devoted to guided missiles; 15 percent to the development of more advanced aircraft, their propulsion systems, and armament; 15 percent to basic and applied research of general military applicability, including the development of special materials, components, and techniques; 11 percent to improving equipment related to communications, navigation, detection, warning, training, and medical activities; 7 percent to research on combat and support vehicles, artillery, and ammunition of all types; and 4 percent to improving the design and construction of ships, submarines, and smaller craft. The remaining 30 percent accounted for the costs of operating and managing research facilities.

About 40 percent of these research activities was carried on in Government-operated facilities, 50 percent in industrial organizations, and 10 percent in educational and other nonprofit institutions. The Government effort in this area involved nearly 60,000 civilian employees and 50,000 military personnel in fiscal year 1957.

The coordination of research and development programs has been effected since February 1957 by the Assistant Secretary of Defense (Research and Engineering). This office, as noted earlier, was created by fusing the staffs concerned with applications engineering and research and development. Its responsibilities include the preparation of broad policy guidance and the review of the research programs of the military departments. It is concerned not only with avoiding unnecessary duplication but also with encouraging, when desirable, parallel approaches in high-priority projects. It guides research into new fields where special emphasis appears needed and insures that the supporting programs are adequate.

Valuable assistance in this work has been provided by the Defense Science Board, established in December 1956. This Board is composed of the heads of major governmental research agencies, outstanding members of the scientific community, and the chairmen of the top research advisory groups of the military departments and the Office of the Secretary of Defense. The Board gives advice on the effectiveness of the entire military research and development effort and points out scientific opportunities that are likely to contribute most to the further modernization of our armed forces.

The evaluation of present and future weapons systems has been since 1949 the responsibility of the Weapons Systems Evaluation Group (WSEG). This group operates under the administrative control of the Assistant Secretary of Defense (Research and Engineering) and receives its assignments from both the Joint Chiefs of Staff and the Assistant Secretary. Its scientific resources were expanded in April 1956 with the establishment of the Institute for Defense Analyses (IDA), with which the Department of Defense signed a contract in September 1956. As a result, WSEG acquired the cooperation of five educational institutions in bringing the best scientific talents of the Nation to bear on the analysis of military problems.

During the past fiscal year, this fusion of civilian and military talents has paid high dividends. The technical staff was substantially expanded—although the number still fell short of the original goal. The number of major studies completed was doubled. An effective blending of professional scientific and military personnel has been achieved, each contributing his specialized knowledge without restriction. This type of teamwork, essential in the analysis of present and future situations in which weapons may be used, is making the WSEG contribution of constantly increasing value to the Department of Defense.

In the field of nuclear weapons, the Armed Forces Special Weapons Project coordinated the participation of military personnel in a series of tests that began in May 1957 at the Nevada test site of the Atomic Energy Commission. These tests contributed significantly to the further development of air-to-air defensive weapons and provided increased knowledge on the reduction of radioactive fall-out and on the effects of atomic detonations on personnel and equipment.

All military Services made progress in the application of nuclear energy to military uses during the past year. The Navy, profiting from its experience with nuclear-powered submarines, began the construction of a nuclear-powered cruiser. The Air Force continued its study of a nuclear turbo-jet aircraft engine. The Army began operating its first package power reactor in April 1957—a small reactor designed in a number of sections for easy transportability.

Construction was also started on the Army's radiation center for irradiating food—a process that gives high promise of preserving fresh foods for long periods without refrigeration.

The work on intercontinental and intermediate-range ballistic missiles (ICBM and IRBM) has been under the direction of the Special Assistant to the Secretary of Defense for Guided Missiles since March 1956. A separate Fleet Ballistic Missiles Program was established in December 1956 to speed the development of the solid-propellant POLARIS. The coordinating responsibility of the Special Assistant was extended in May 1957 to include the Army's REDSTONE, Project VANGUARD, and other long-range missile programs as well as anti-missile projects.

The ICBM and IRBM programs have been operating under the highest national priority since November 1955. The streamlined procedures that are being employed promise significant reductions in the usual lead-time for the development of major weapons. In view of the importance of these programs, parallel approaches to the solution of complex technical problems were authorized. Programed obligations for the 3 IRBM systems—the liquid propellant, land-based JUPITER and THOR and the solid propellant, ship-based POLARIS—and for the 2 ICBM systems—the liquid propellant, land-based ATLAS and TITAN—rose from \$515 million in fiscal year 1956 to \$1,365 million in 1957 (fig. 5).

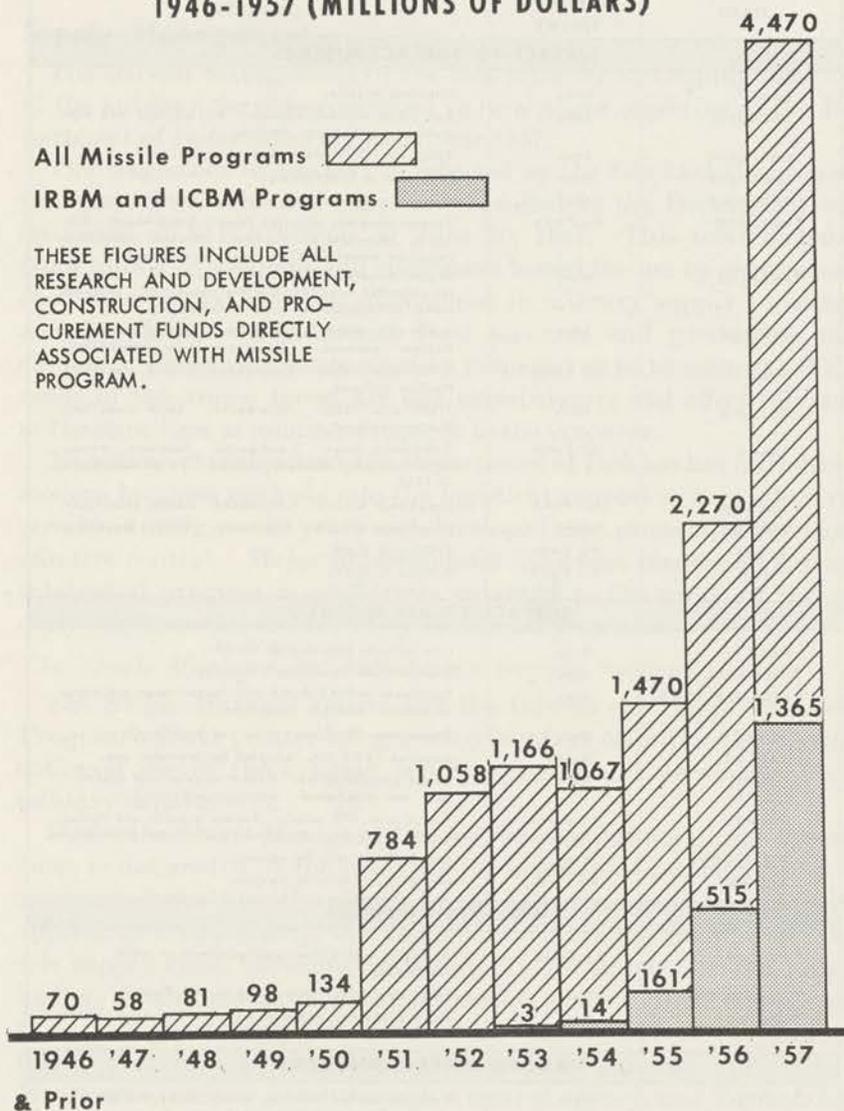
Programed obligations for guided missiles systems totaled \$4.5 billion in fiscal year 1957—almost twice the amount obligated during the preceding year. These obligations include the developmental and capital costs involved in bringing missile systems to an operational status plus the costs of procuring missiles for operational purposes.

Not counting improved versions of earlier models, the guided missiles programs on June 30, 1957, included 15 surface-to-surface, 9 surface-to-air, 3 air-to-air, and 3 air-to-surface missiles (fig. 6). Nine of these missiles were operational at the close of the fiscal year. In addition, such unguided rockets as the Army's surface-to-surface HONEST JOHN, the Navy's air-to-air and air-to-ground ZUNI, and the Air Force's air-to-air GENIE had been delivered to operational units, and work on the LITTLE JOHN, a lighter version of the HONEST JOHN, was near completion.

As a result of the rapid progress in this field, missiles that only recently became operational are already being replaced by a second generation of improved weapons. Similarly, in the research stage, accelerated schedules in the development of more advanced weapons may permit the cancellation of intermediate projects. Thus, the number of guided missile programs is constantly being adjusted.

In the past few years, tremendous strides have been made in the development of new weapons. Programs currently under way prom-

## GUIDED MISSILES SYSTEMS PROGRAMMED OBLIGATIONS 1946-1957 (MILLIONS OF DOLLARS)



NOTE: NOT SHOWN ARE \$2.3 MILLION PROGRAMMED IN FISCAL YEARS 1946-1949 FOR MX-774, AIR FORCE BALLISTIC MISSILE RESEARCH, AND \$0.5 MILLION AND \$0.8 MILLION PROGRAMMED FOR BALLISTIC MISSILES IN FISCAL YEARS 1951 AND 1952 RESPECTIVELY.

*Figure 5.*

GUIDED MISSILE PROJECTS		
JUNE 30, 1957		
NAME	DEVELOPING SERVICE	COMMENTS
<b>SURFACE-TO-SURFACE MISSILES</b>		
DART	Army	Anti-tank missile.
LACROSSE	Army	For close tactical support. Will replace and supplement conventional artillery.
* CORPORAL	Army	Range over 75 miles. Nuclear capability.
SERGEANT	Army	Successor to CORPORAL.
REDSTONE	Army	200-mile range ballistic missile. Nuclear capability.
* MATADOR	Air Force	Several hundreds of miles range. Land-based. Subsonic, jet-propelled missile. Nuclear capability. Improved model (MACE) under development.
* REGULUS	Navy	Several hundred miles range. Ship-based. Subsonic, jet-propelled missile. Nuclear capability. Improved model (REGULUS II) under development.
JUPITER	Army	1,500-mile IRBM. Land-based. Liquid propellant. Nuclear warhead. Developed from REDSTONE.
THOR	Air Force	1,500-mile IRBM. Land-based. Liquid propellant. Nuclear warhead.
POLARIS	Navy	1,500-mile IRBM. Ship-based. Solid propellant. Nuclear warhead.
SNARK	Air Force	5,000-mile range. Land-based. Subsonic, jet-propelled missile. Nuclear warhead. To be operational in 1958.
NAVAHO	Air Force	Long-range missile. Land-based. Ramjet propulsion.
TRITON	Navy	Long-range missile. Ship-based. Ramjet propulsion.
ATLAS	Air Force	5,000-mile ICBM.
TITAN	Air Force	5,000-mile ICBM.
<b>SURFACE-TO-AIR MISSILES</b>		
HAWK	Army	Low altitude anti-aircraft missile.
* NIKE-AJAX	Army	High altitude anti-aircraft missile.
NIKE-HERCULES	Army	Successor to NIKE-AJAX with longer range and higher altitudes. Nuclear capability.
* TERRIER	Navy	Range over 10 miles. Ship- and land-based.
TARTAR	Navy	Modified TERRIER. Adapted for destroyer use.
TALOS	Navy	Range over 50 miles. Rocket booster and ramjet. Ship- and land-based. Atomic capability.
BOMARC	Air Force	Range over 200 miles. Rocket booster and ramjet. Atomic capability. Improved models under development.
NIKE-ZEUS	Army	Anti-ballistic missile weapon.
WIZARD	Air Force	Anti-ballistic missile weapon.
<b>AIR-TO-AIR MISSILES</b>		
* FALCON	Air Force	Available with either radar guidance or infra-red homing.
* SIDEWINDER	Navy	Infra-red homing. Also used by Air Force.
* SPARROW	Navy	Radar guidance. Improved models under development.
<b>AIR-TO-SURFACE MISSILES</b>		
* PETREL	Navy	Turbojet guided missile, which drops torpedo near target. Production completed.
RASCAL	Air Force	Range over 75 miles. Nuclear capability. To be operational in 1958. Improved version (HOUND DOG) under development.
BULLPUP	Navy	Tactical weapon for use by Navy and Air Force.
* Operational		

Figure 6.

ise even more spectacular results in the near future. The vast resources of talent and money, with which this work is being pursued, assure that the combat effectiveness of our armed forces will continue to be adequate for our security needs.

### Supply Management

The efficient management of the vast materiel and supply holdings of the military Services continued to be a major objective of the Department of Defense during fiscal year 1957.

The magnitude of the task is reflected by the fact that the acquisition cost of materiel and supplies controlled by the Department was estimated at \$117.3 billion on June 30, 1957. This total included \$57.6 billion of weapons and equipment issued for use by regular and reserve units, \$54.1 billion of materiel in military supply pipelines, and \$5.6 billion in industrial fund accounts and production machinery. These vast assets must be managed so as to assure that the needs of the armed forces are met expeditiously and effectively and at the same time at minimum expense to the taxpayer.

To achieve this objective, the Department of Defense has introduced modern business methods into the logistical support system wherever possible during recent years and developed new procedures for more effective control. Major improvements have been made, and further substantial progress is confidently expected as the result of the orderly implementation of recently developed programs.

#### *\* The Single Manager and Interservice Supply Support*

The Single Manager system and the Interservice Supply Support Program achieve greater integration of support operations by making optimum use of the existing supply systems and personnel of the military departments.

Under the Single Manager plan, the Secretary of a military department is designated as the manager for a group of commodities or a common service for all agencies of the Department of Defense. As applied to a commodity, the assignment covers the complete wholesale supply cycle, including responsibility for standardization; cataloging; determination of net requirements; procurement and inspection; receipt, storage, and issue of stocks; control of inventories; transportation; maintenance; and disposal of surplus. The Single Managers exercise control through a central agency, and the distribution of the commodity is effected through a single distribution pattern involving the facilities of any military Service and serving the needs of all military customers.

The Single Manager system was started during fiscal year 1956 when the Secretary of the Army became responsible for subsistence supplies, domestic traffic functions, and clothing and textiles, while

the Secretary of the Navy was named Single Manager for military medical supplies and ocean transportation management. During fiscal year 1957 two additional assignments were made—petroleum supplies to the Secretary of the Navy and airlift service to the Secretary of the Air Force. Under the Single Manager assignment for petroleum, however, responsibility for stock funding and ownership remained with the military Services. Procurement of commodities by the Single Managers totaled about \$2.3 billion during the fiscal year or more than 15 percent of the procurement actions of the Department of Defense.

Substantial benefits have already been derived from the Single Manager plan through the reduction of inventories, storage facilities, and transportation costs. For example, the Military Subsistence Supply Agency has reduced the total number of different items previously stocked by 48 percent, or from 1,978 to 1,027, and eliminated 16 storage locations for nonperishable food items. The Military Clothing and Textile Supply Agency, through its ownership of all wholesale stocks, has been able to draw extensively upon goods in long supply in one department to meet the requirements of other departments.

Programs for additional standardization and for further reductions in inventories and storage requirements have been started by the Military Medical Supply Agency, the Military Clothing and Textile Supply Agency, and the Military Petroleum Supply Agency. The Military Traffic Management Agency, which became fully operative on July 1, 1957, has been organized into a headquarters, 5 regional offices, and 3 branch offices to assume functions previously discharged by 4 headquarters and 16 field offices of the four military Services. Thus, further economy and efficiency in supply and service operations can be safely anticipated.

For commonly used commodities not adaptable to the Single Manager plan, an Interservice Supply Support Committee was established during fiscal year 1956 to promote the maximum interchange of supplies and facilities between the military Services. Under this Committee, commodity coordination groups identify, on the wholesale level, the items that can be interchanged and assist in eliminating unnecessary procurement of supplies and in preventing long-hauls, cross-hauls, and back-hauls of commodities. In the United States, six area coordination groups promote the maximum exchange of supplies at the retail level between using organizations in each area. Overseas, unified commands have been assigned similar responsibilities.

During fiscal year 1957, 28 additional commodity coordination groups were chartered, bringing the total to 36. Exchanges of supplies reported by these coordination groups totaled \$201 million dur-

ing the past year—\$65 million at the wholesale level in the United States and \$136 million overseas and at the retail level in the United States.

The Department's experience with the Interservice Supply Support Program and the Single Manager system has demonstrated the possibility of substantial savings and greatly improved supply operations. The Department of Defense is studying the feasibility of extending these supply management techniques to additional commodities. Such extensions will be undertaken whenever the further integration of supply channels promises to increase the effectiveness of logistics support and produce operational economies.

#### *Cataloging and Standardization*

Interservice supply support operations have been greatly facilitated by the progress made in the cataloging and standardization programs of the Department of Defense. In December 1956, the identification phase of the Federal Cataloging program was completed on schedule, after 3,128,613 different items in military supply systems had been identified by name and number, classified into commodity groups, and recorded. Completion of this task, which began in July 1952, provided the Department for the first time with complete and accurate knowledge of the total items stocked and the designer, manufacturer, supplier, and military user of each.

Maintaining the catalog system on an up-to-date basis represents a continuing task. New items entering supply systems will have to be identified, existing descriptions amended as necessary, and obsolete items eliminated. It is estimated that approximately 1,000,000 such actions must be processed each year. The program for the installation of automatic data processing equipment and rapid transmission equipment, begun during fiscal year 1957, will assure that these changes can be recorded and disseminated to military supply managers with a minimum loss of time.

Work continued during the past year, in cooperation with the General Services Administration, to cover items in the supply systems of Federal civil agencies. So far, some 60,000 items have been identified.

The military Services made significant progress during the fiscal year in converting their supply systems to Federal stock numbers. On June 30, 1957, about 73 percent of the conversion phase of the catalog program had been completed, with about 2,600,000 of an estimated 3,600,000 items processed. This represented an increase of 1,600,000 during the year, somewhat more than scheduled. The Army completed its conversion to the catalog in June 1957, 4 months ahead of schedule. The other three military Services expect to finish their conversion actions by December 1958.

Closely related to cataloging is the standardization program of the Department of Defense for reducing the number of different items in military supply systems. Of the 537 supply categories in the Federal Catalog, 239 have been assigned to the Department of the Army for standardization, 183 to the Department of the Navy, 87 to the Department of the Air Force, and 1 to the National Security Agency. The remaining 27 classes are composed of items still under development or lacking potential for standardization. These standardization activities are carried out in close cooperation with industrial, technical, and professional associations.

During this fiscal year 149,000 different items were eliminated from the supply systems of the military Services, bringing the total reductions since 1952 to 587,000. Actions completed during the past year included the adoption of military standards and specifications for antifriction airframe roller bearings—permitting the replacement of 440 commercial varieties with 47 standard military types and sizes—and the approval of uniform packing, packaging, and marking standards for certain petroleum products. The measures taken during the fiscal year are estimated to free some 3,100,000 cubic feet of storage space for other purposes and save more than 250,000 man-hours of labor. Important as these savings are, the primary benefit of standardization lies in its contribution to the more efficient operation of military logistical support systems.

#### *Procurement*

The guidance for determining materiel requirements is based on National Security Council policies as approved by the President and on the war plans of the Joint Chiefs of Staff in support of these policies. Using this logistical guidance, the military departments compute the numbers and types of equipment and supplies required to carry out the missions assigned to them.

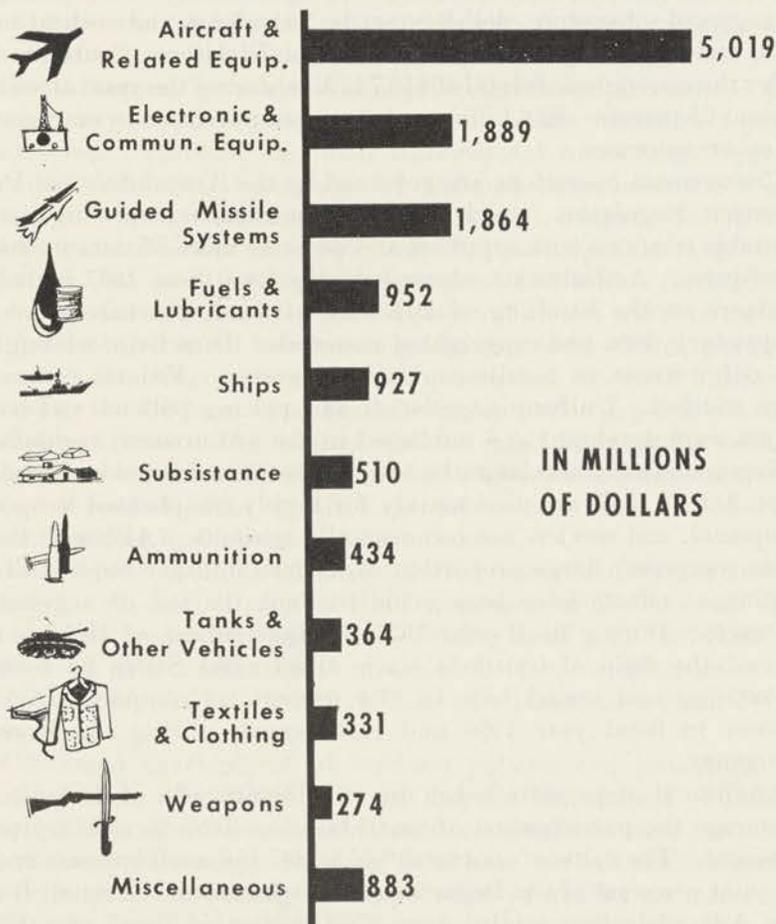
Procedures for the review of departmental requirements programs were improved during the fiscal year through the joint efforts of the Office of the Secretary of Defense and the three military departments. A thorough examination was made of such factors as the basis of issue, replacement and consumption rates, stocks on hand and in pipelines, available substitutes, time-phasing of correlated items, and technological progress. The teamwork achieved in reviewing requirements programs will contribute to further improvements in the years ahead.

During fiscal year 1957 the net total of contracts involving orders of over \$10,000 for materiel and supplies procured in the United States was \$13.4 billion—\$1.8 billion for food, fuel, and textiles and \$11.6 billion for “hard” goods (fig. 7).

About 75 percent of the funds obligated in these contracts were handled under some kind of single department procurement assign-

## PROCUREMENT ACTIONS FOR MATERIEL AND SUPPLIES WITH U.S. BUSINESS FIRMS FISCAL YEAR 1957

Actions of \$10,000 or more: 13,447



Actions below \$10,000

All Actions 1,281

Figure 7.

ment—whereby one agency acts as contracting authority for a commodity on behalf of all military customers. Through such coordinated procurement the Department of Defense has obtained more favorable price and contract terms, concentrated industry relationships at one point for both peacetime and mobilization requirements, and provided for better distribution of items in short supply. During fiscal year 1957, 37 formal assignments of single department procurement responsibility were continued—30 to military departments, 4 to the Single Managers of subsistence, clothing-textiles, petroleum, and medical supplies, and 3 to the General Services Administration. Contracts let under these assignments totaled \$10.7 billion during the year, of which amount 25 percent—\$2.6 billion—represented purchases by one agency for other customers.

Procurement operations are governed by the Armed Services Procurement Regulation, which is under continuous review to assure equitable relations with suppliers and promote more efficient uniform procedures. Amendments adopted during fiscal year 1957 included guidance on the handling of late bids, of small purchases, and of proprietary data and copyrighted materials. Directives relating to the enforcement of nondiscrimination clauses in Federal contracts were codified. Uniform negotiation and pricing policies and techniques were developed and published in the procurement regulation.

Negotiated contracts, as authorized by the Armed Services Procurement Act of 1947, are used mainly for highly complicated weapons, equipment, and services not commercially available. Although these items comprise a large proportion of modern military requirements, continuous efforts have been made to limit the use of negotiated contracts. During fiscal year 1957 the Department of Defense increased the ratio of contracts let in the United States by formal advertising and sealed bids to 17.4 percent, as compared to 15.9 percent in fiscal year 1956 and 11.3 percent during the Korean emergency.

Additional steps were taken by the Department of Defense to encourage the participation of small business firms in military procurement. The value of contracts "set aside" for small business under the joint program of the Department of Defense and the Small Business Administration totaled over \$702 million in fiscal year 1957, as compared to \$490 million in fiscal year 1956—an increase of over 40 percent. Under a new policy initiated during 1957, small firms obtained set-aside awards at the highest price paid to successful bidders for other parts of the same procurement, rather than at the weighted average price of all successful bidders. These special efforts played an important part in increasing the dollar value of contracts awarded to small firms from \$3.5 billion in fiscal year 1956 to \$3.8

billion in fiscal year 1957—a 9 percent rise. Small business contracts represented 19.8 percent of the total award of \$19.1 billion to business firms in the United States for material, construction, and services and 60.5 percent of the total procurement determined to be within the potential of small business firms to produce. An analysis was made of the reasons for the failure of small business to receive contracts of \$10,000 or more and revealed that small business concerns failed to submit bids on 7.6 percent of the offerings, did not bid low on 31.9 percent, and lost 1.4 percent through failure to comply with specifications or lack of sufficient productive capability.

Small business firms also contributed significantly to defense production as subcontractors supplying components to military prime contractors. Through the Small Business Subcontracting Program, established by the Department of Defense, large contractors give small concerns an equitable opportunity to compete for defense subcontracts. Under this program, 216 participating large firms reported that small business firms received \$3.5 billion during fiscal year 1957 for subcontract work—an amount almost equal to the \$3.8 billion awarded small business in prime contracts. These payments for subcontracting represented 20.9 percent of the \$16.6 billion received by the 216 large firms for defense production in prime contracts and subcontracts. The total receipts of small business for military subcontracting undoubtedly exceeded \$3.5 billion, since this total does not include data on all large prime contractors nor further subcontracting by the original subcontractors.

To preserve the country's mobilization potential in areas and industries with a labor surplus, the Department of Defense sets aside some procurement for such firms. During fiscal year 1957 contracts valued at \$401 million were awarded to labor-surplus areas and industries, of which total \$11 million were placed as a result of this program.

Continued development of uniform policies and procedures for the inspection of materiel produced for the Department of Defense resulted in greater assurance that military standards were met. New instructions were adopted during fiscal year 1957 to achieve greater uniformity in the writing and application of quality-assurance provisions in specifications and to provide for inspecting by sampling techniques. Inspection procedures have been designed to protect the Government without duplication of work among the military Services or unnecessary repetition of inspections undertaken by suppliers.

About 1,700 commercial and industrial activities operated by the Department of Defense have been surveyed under the program initiated in 1953 to reduce the number of such Government-

owned facilities. During fiscal year 1957 the discontinuation or curtailment of operations was approved for 157 activities, bringing the total number of such determinations to 585. About 1,100 facilities have been tentatively approved for retention, pending reanalysis of cost factors. Bakeries, laundries, automotive and office equipment repair shops, ice plants, and similar manufacturing and maintenance installations were included in the survey. Action has also been taken to negotiate the sale to commercial companies of some 125 Government-owned telephone systems.

#### *Inventory Control, Storage, Distribution, and Disposal*

Further progress was realized during fiscal year 1957 in carrying out long-range programs for achieving more effective and economical management of materiel in military supply systems.

Basic policies for the control of supply inventories were revised and improved in October 1956. Under this revised guidance the military Services are establishing central inventory control points, each of which computes worldwide requirements for an item or group of commodities, directs procurement and disposal, develops quantitative and accounting data, and positions stocks for effective distribution. As of June 30, 1957, the Department of the Army had completed review and assignment of 301 of the 537 Federal Supply Catalog classes to a single Technical Service for inventory control management, and the Department of the Navy had eliminated over 32,000 duplications in assignment of items to supply bureaus. The Department of the Air Force, which had initiated single inventory control methods in 1947, continued to benefit from these procedures.

Supply operations were greatly improved with the introduction during the fiscal year of 28 standard Department of Defense supply forms for requisitioning, invoicing, shipping, receiving, issuing, and transferring materiel. Replacing 120 forms previously used by the military departments, the new standard forms established uniform means for high-volume supply transactions throughout the armed forces, simplified the task of training supply personnel, and eliminated the expense of printing and stocking the numerous superseded forms.

To assure maximum utilization of available storage facilities, standard procedures were adopted during fiscal year for reporting the use and occupancy of storage space and for determining and projecting future requirements at major depots. These procedures, which carry out recommendations of the Hoover Commission, provided a worldwide inventory of available space as well as a management tool for determining the validity of requests for construction or the conversion of storage facilities. More effective use of available space was made by military warehousemen as a result of the publication in No-

vember 1956 of the Joint Storage and Materials Handling Manual. This manual, which replaced 27 separate publications, set forth methods, procedures, and techniques for application throughout the Department of Defense.

In addition to promoting operational economy, through the Single Manager system for land traffic management, ocean transportation, and airlift service, the Department of Defense continued to seek other reductions in its transportation costs. Substantial savings in manpower and funds were achieved through the merger of military ocean terminal facilities in the Seattle area, and studies were initiated of the feasibility of such mergers at other ports in the United States. Through negotiations with commercial carriers for rate adjustments on military traffic, the Department of Defense realized savings for the fiscal year estimated at \$37.8 million—\$18.2 million on freight charges and \$19.6 million on passenger traffic. Legislation enacted shortly after June 30, 1957, preserved the right of commercial carriers to offer these reduced rates to the Federal Government and stabilized the process by which such negotiations are conducted.

Increased emphasis was placed during fiscal year 1957 on programs for the disposal of supplies excessive to current and mobilization requirements. Revised instructions were issued to cover the demilitarization of items prior to disposal, the donation of surplus personal property to educational activities, and the reporting system for surplus stocks. Excess property of one military department is offered, first, to the other military services, then to other Federal Government agencies, and finally, under the donation program, to state agencies and educational institutions. During the fiscal year property valued at an acquisition cost of almost \$71 million was transferred to other Federal agencies. An additional \$190 million in property was donated to eligible recipients. Usable items that cannot be disposed of through transfer or donation are offered for sale to the public. The adoption of improved merchandising techniques in recent years continued to assist in increasing the returns from such sales. Property with an estimated acquisition cost of \$1.4 billion was sold during the year, almost entirely through competitive bidding. It brought a return of \$111 million—8.1 percent as compared to 7.5 percent in the preceding fiscal year. Items not suitable for sale were scrapped or destroyed. Sales of scrap yielded an additional return of \$74 million.

### **Mobilization Planning**

Industrial mobilization planning, carried on by the Department of Defense and other government agencies under policies established by the Office of Defense Mobilization, touches upon almost every sector of the Nation's economy. It involves programs for expanding and

maintaining productive capacity, stockpiling critical strategic materials, and administering the priorities and allocation system. Increasing emphasis has been given during recent years to special problems created by the possibility of a nuclear attack upon the United States.

The buildup of our current industrial mobilization has been achieved, particularly since the outbreak of Korean hostilities, through private investment, stimulated by Government orders and incentives, with the direct use of Federal funds for facilities held to a minimum. Military orders since July 1, 1950, involved deliveries of \$144.1 billion in materiel, supplies, and construction, \$18.4 billion of which were received during fiscal year 1957.

Additional impetus to industrial expansion has been provided through the incentive of rapid tax amortization for new facilities contributing directly to national defense. Since this incentive was enacted in 1950, facilities costing \$38.2 billion have been certified as necessary for defense production, with \$23.1 billion found eligible for rapid amortization. By June 30, 1957, all but 4 of some 250 expansion goals had been closed. In accordance with amendments to the Internal Revenue Code of 1954, approved shortly after the close of the fiscal year, future tax certifications will be limited to facilities for producing new or specialized defense items and for providing research, developmental, and experimental services to the military departments and the Atomic Energy Commission.

Direct governmental investment in the expansion of productive capacity has included the obligation by the Department of Defense since 1951 of approximately \$6.6 billion—\$0.2 billion during the past year. About two-thirds of the total, \$4.4 billion, has been allocated to machine tools and other production equipment; one-fourth, \$1.5 billion, to construction or rehabilitation of facilities; and the remainder, \$0.7 billion, to related costs. Over 50 percent of these funds were programed for facilities outside of the most likely target areas.

Further large-scale expansion of industrial capacity is no longer a goal in view of the achievements of recent years, although the development of new weapons systems will require some adjustments in the mobilization base. The maintenance of present facilities in an adequate state of readiness continues to represent a major problem.

Plants not currently engaged in producing military goods are either converted to civilian uses or placed on a standby status. Those owned by the Government are sold outright if not required for mobilization or are placed in the National Industrial Reserve or the plant reserves of the military departments. On June 30, 1957, the National Industrial Reserve included 97 facilities, of which 80 had been sold subject to recapture in an emergency, 15 were being operated under

lease or contract, and 2 were inactive. The military departments maintained 404 facilities in reserve, valued at an acquisition cost of \$5.9 billion, including 89 plants operated by the Government, 236 operated by contractors, 76 in standby status, and 3 declared excess but not yet transferred to the General Services Administration.

Under broadened guidance adopted in March 1957, all industrial production equipment owned by the Department of Defense, active and inactive, wherever located, has been made subject to mobilization planning for redistribution in time of emergency. Formerly, redistribution was planned only for items held in reserve. As of June 30, 1957, the inventories reported by the departments included 255,800 pieces of metalworking equipment (with an acquisition cost of \$3.0 billion) and 389,400 pieces of other production equipment (costing \$2.3 billion). About 6,200 pieces of metalworking and related production equipment were redistributed from inactive inventories to defense contractors during the year and 26,700 pieces were returned to inactive storage, which on June 30, 1957, included 84,400 pieces. To assure a maximum state of progress under a continuing readiness, work continued under the program for testing the performance capabilities of reserve equipment and for repairing or disposing of substandard items. Completion in December 1956 of an improved Directory of Metalworking Machinery, last revised in 1951, provided an up-to-date system for managing machine tools.

A substantial amount of reserve production equipment has been placed in "package plants"—storage areas containing a complete complement of Government-owned equipment for producing military end-items or components—and "standby lines"—installed reserve equipment. Proposals for 495 such "package plants" and "standby lines" were approved during the fiscal year. These holdings will be reviewed annually against mobilization requirements to assure the availability of equipment for programs of high urgency and to avoid the possibility of holding idle an excessive amount of machinery.

The general policies governing the stockpiling of critical and strategic raw materials are set by the Office of Defense Mobilization, while the General Services Administration is responsible for operations. The Department of Defense participates in the review of objectives in the light of changing military requirements and strategic concepts. As a result of these reviews, future procurement of materials will be based on the needs for a 3-year emergency period, rather than a 5-year period. Additional purchases during the coming fiscal year will be limited to nine materials. Stocks on hand are valued at an acquisition cost of \$7.4 billion.

In the field of production planning with industry, the Department of Defense gave increased attention during fiscal year 1957 to problems

related to surprise nuclear attack. Studies were initiated for a greater variety of contingencies. Possible alternative solutions for meeting productive requirements under conditions of a post-attack situation were being tested at the close of the fiscal year. About 18,500 firms, a reduction of 2,500, were included in the 1957 revision of the Register of Planned Mobilization Producers which lists concerns participating with the Department of Defense in mobilization production planning. To meet increasing maintenance requirements imposed by highly complex modern weapons, planning activities were extended to include commercial and industrial maintenance production capacity to supplement facilities at military depots in case of an emergency.

The Department of Defense Master Urgency List, including the most essential military projects, was revised during the fiscal year to reflect current national policy. Deliveries of military equipment were accelerated during fiscal year 1957 by the assignment of priority ratings to orders and the allocation of materials to contractors. Some 4,200 requests for special assistance in obtaining materials, components, end-items, and production equipment and in adjusting schedules were processed by the Department of Defense. Special procedures to assure full support of long-range ballistic missiles through the industrial priorities system were issued.

### **Financial Management**

Continued progress was made during the past year in fitting the budgeting, disbursing, and accounting procedures of the military departments into an effective system of financial management. Procedures for controlling expenditures were more closely adjusted to the multiplicity of functions discharged by the military Services. For capital investment, manufacturing, and merchandizing operations, accounting systems much like those used in business are employed, while for combat and combat-support functions that have no civil counterpart, special methods are required. The integration of these separate procedures into a single system of financial management will, when completed, permit the accurate measurement of performance and provide increasingly meaningful data to the Congress and to all administrative levels within the Department.

Further refinements were developed during fiscal year 1957 to improve the Department's program budget—the grouping of funds under major functions, with capital expenditures separated from operating costs. Principal attention was given to simplifying procedures for handling operations and maintenance funds. Budget programs financed from this appropriation by the Department of the Army were reduced, under a functional accounting structure adopted on July 1, 1957, from 16 to 8, and projects and subprojects from 180 to about 50. This new procedure facilitated the identifica-

tion of costs for all major programs and greatly assisted the Department of the Army in the control of expenditures. The Departments of the Navy and the Air Force reviewed their budgeting and accounting procedures for operating and maintenance funds with the objective of introducing similar improvements.

In the area of procurement and production of capital-type materiel, the Department of Defense established the general requirement that no procurement of materiel or equipment should be directed or authorized unless adequate appropriations or other funds are available for completing the production of the entire end-items and related spare parts. This policy should have the effect of establishing a Defense-wide system for better budgeting and control of the total cost of procurement and production programs in terms of the principal end-items being procured. It will eliminate use of authorized funds for the procurement of components of end-items in a greater quantity than authorized.

Better management of funds for procurement, construction, research, and development was made possible by the adoption of commitment accounting throughout the Department of Defense at the beginning of the fiscal year. Commitment accounts show that portion of unobligated funds for which firm obligation authorizations have been issued but not executed and thus contribute to a better understanding of the status of appropriated funds. Special guidance was issued in May 1957 to insure a common understanding among all agencies of the Department of previously established policies limiting procurement actions to those for which funds were fully available under departmental financial plans. The purpose of this directive was to assure the orderly execution of procurement programs on a uniform basis throughout the Department of Defense.

In the development of integrated systems of accounting on an accrual basis, special emphasis was placed during the year on construction accounts. For better control of construction expenditures, the Department of Defense directed the establishment of a uniform budgeting and recruiting system for costs and obligations.

Additional refinements were introduced by the military Services into their inventory accounting and reporting systems. Uniform pricing policies were adopted for use in determining the value of stocks on hand in the military supply systems and for transfers and issues. As a result of these and other steps, more accurate and timely monetary data are being provided to assist in the management of fixed assets and consumable goods controlled by the Department of Defense.

The use of working capital funds was still further extended during fiscal year 1957, and the operations managed through these funds

were simplified and improved through revisions in regulations and reporting requirements. Inventories capitalized under stock funds were increased during the year by \$1.0 billion—from \$9.8 to \$10.8 billion. The number of industrial and commercial operations financed through industrial funds was increased by 4 during the fiscal year, and on June 30, 1957, included 21 Army, 25 Navy, and 2 Air Force activities.

Working capital funds were established with the objective of promoting managerial efficiency and providing incentives for more economical operations throughout the Department of Defense. Experience has indicated that this objective is being met.

### **Properties and Installations**

On June 30, 1957, the Department of Defense controlled 35,000,000 acres of land, valued with buildings and other improvements at an acquisition cost of \$24.9 billion. Over one-half of these holdings, 18,600,000 acres, had been obtained by withdrawals from the public domain; slightly under one-fourth, 7,800,000 acres, had been acquired by purchase or gift; and the remaining one-fourth, 8,600,000 acres, consisted of foreign bases, leased real estate, property made available for temporary use, and easements. Some 27,300,000 acres were located within the continental United States, 5,000,000 in territories and possessions, and 2,700,000 in foreign countries. The Department of the Army had management responsibility for 31.2 percent of the total acreage, the Department of the Navy for 14.1 percent, and the Department of the Air Force for 54.7 percent. In addition, 3,900,000 acres, not included in the above totals, were controlled by the Department of the Army for use in the civil works projects of the Corps of Engineers.

During fiscal year 1957 the Department of Defense accelerated its program to reduce its holdings by evaluating all military installations in the light of present and future requirements. Approximately 1,000,000 acres of land, with an acquisition cost of \$670 million, were identified as excess to the needs of the controlling military service. Action is being taken to determine whether any of this property should be transferred to another military Service or released as excess to total defense requirements for disposal by the General Services Administration. During the fiscal year, 275 properties, valued at \$85.2 million, were made available for disposal. Since 1946 the military Services disposed of 9,700,000 acres, valued with improvements at \$3.8 billion. During the same period, acquisitions amounted to 5,500,000 acres, valued at \$0.2 billion—resulting in a net reduction of 4,200,000 acres with an acquisition cost of \$3.6 billion.

Plans are also being developed for the disposal of high-priced properties with a portion of the proceeds being used for the purchase of

less expensive and more adequate facilities. This problem has arisen from the fact that many military installations, originally situated in outlying areas, have been partially or completely surrounded by urban development. The dollar value of these holdings has multiplied, while their usefulness is becoming more and more limited and the possibilities of expansion are being ruled out by prohibitive costs. In the acquisition of new holdings, full attention is being given to assuring maximum joint utilization by two or more military Services wherever feasible.

In the construction field, new plans for military hospitals were adopted and additional standards and criteria for family housing units issued. Instructions governing the use of protective construction—dispersed, blast-resistant, and radiation-proof buildings—were revised.

Continued attention has been given to the improvement of maintenance activities. Inspection and work-scheduling techniques were refined as the result of the experience with standards established during the past 2 fiscal years. Additional progress was achieved in the development of a uniform accounting system for maintenance costs. Studies have also been undertaken to develop uniform standards for the installation of the air conditioning.

Modern weapons systems are placing new requirements for real estate on the military Services. Heavy jet bombers need 12,000-foot runways as compared to 5,000-foot runways for propeller-driven planes. Guided missile test and training sites are measured in millions of acres, while 50,000 acres were ample for artillery ranges. While some existing installations can be expanded to meet new requirements, in other areas, the disposal of an outmoded facility and the building of a modern one will be more economical.

In the light of this situation, the Department of Defense continued to review carefully the necessity, cost, location, and design of all acquisition and construction projects. This screening process has been greatly facilitated and speeded up by the standard construction and design criteria adopted in recent years.

Expenditures for military public works amounted to \$1.9 billion during fiscal year 1957, as compared to \$2.0 billion during the preceding year. On June 30, 1957, unobligated balances totaled \$0.7 billion—believed to be the minimum amount necessary to permit the orderly continuation of construction and planning activities. Unexpended balances amounted to \$2.6 billion on the same date. The progress made in the management of these funds becomes evident by comparison with the figures for June 30, 1953, when unobligated balances totaled \$3.2 billion and unexpended balances \$5.0 billion. Reductions of \$0.1 billion were achieved in both categories during fiscal year 1957.

In preparing estimates for fiscal year 1958, projects on which no work had begun or which would be deferred without seriously affecting military operations were eliminated whenever possible. During this review, the estimates were reduced by almost \$2.0 billion. The Congress, shortly after the close of the fiscal year, authorized new construction to the amount of \$1.2 billion and appropriated \$1.5 billion for these projects and others previously authorized.

Substantial new investment in fixed facilities will be required in the coming years to permit the progressive modernization of our weapons systems. Maintenance costs for existing installations are also rising. To counter this trend as much as possible, the Department of Defense must continue to improve its requirements review, accelerate the disposal of surplus facilities, and increase the joint utilization of property. Existing management procedures have been designed to fill this need.

#### **IV. Mutual Security**

During fiscal year 1957 the communist threat to the free world continued unabated. World communism rejected all disarmament proposals containing minimum safeguards against surprise attack and, at the same time, continued to modernize and strengthen the armed forces at its disposal. It issued threats against nations of the free world banded together for common defense and resorted to naked force to crush the revolt of the freedom-seeking Hungarian people. It offered economic and military aid ostensibly without conditions, but ultimately as a means to infiltrate uncommitted nations and to increase regional tensions wherever possible.

As a counter to this continuing threat, the United States and like-minded nations have established regional organizations for the preservation of their freedom and created collective military power for the deterrence of aggression. Some 42 nations have joined with the United States in mutual defense arrangements. Grant military assistance has been extended to 45 nations. These countries, and 21 others, may also purchase military equipment from the United States. With United States assistance supplementing their own efforts, our allies are maintaining ground forces that total 4,700,000 men (an increase of 31 percent since 1950), navies that include 2,500 combat ships (108 percent more than in 1950), and air forces with 32,000 aircraft (88 percent more than in 1950) (fig. 8).

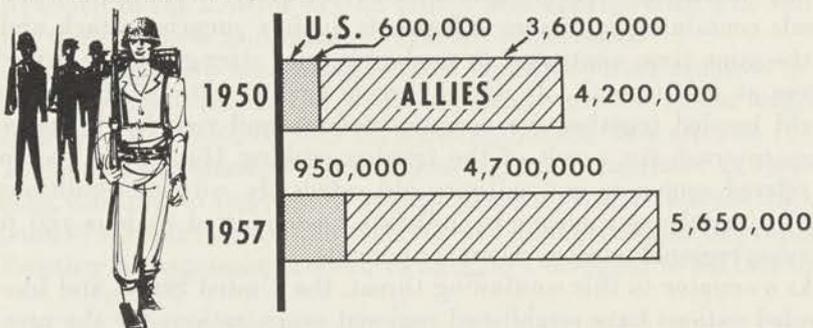
This strength has been built by cooperative action and its continued development constitutes an integral part of our defense programs. By their contribution to this mutual undertaking the American people obtain substantially more security per dollar than if they were to add these funds to their own defense expenditures.

The United States continued during fiscal year 1957 to shift the emphasis in its military assistance program from Europe to Asia and the Middle East—reflecting changing pressures in the world situation and substantial progress in Europe. Thus, the 1957 Far East programs received 46 percent of the military assistance as compared to 5 percent in 1950, while the Middle East programs received 27 percent in 1957 in contrast to 16 percent in 1950. The percentage allocated to Europe declined from 79 percent in 1950 to 25 percent in 1957. Special attention has been given in recent years to helping our allies increase their defense potential by the introduction of more modern weapons.

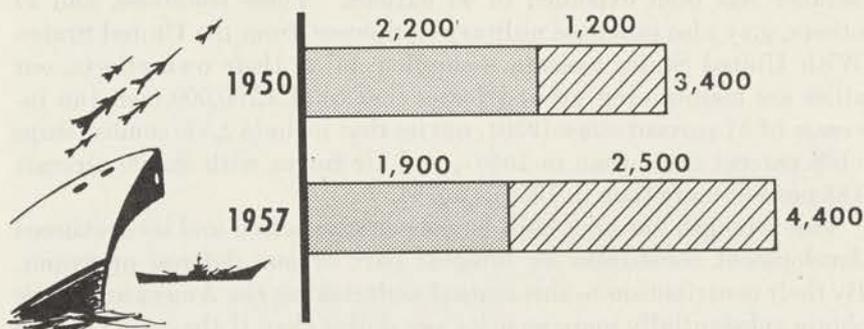
The immediate task ahead is to continue the programs for the modernization of allied forces facing the direct threat of aggression. In

## BUILDUP OF FREE WORLD DEFENSES

### ACTIVE ARMY FORCES



### COMBAT SHIPS (Including Reserve Fleets)



### AIRCRAFT

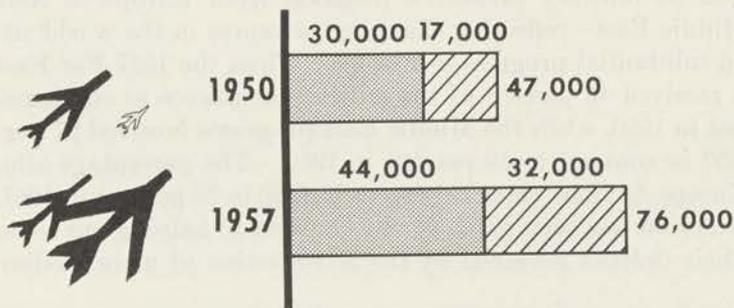


Figure 8.

this mutual undertaking the United States carries a major responsibility not only for its own security but also for that of the entire free world. The hazards to our Nation and expenditures for our defense would be immeasurably greater were we deprived of oversea bases, sources of strategic materials, and allied forces.

### **Military Assistance**

The military assistance programs administered by the Department of Defense include the contribution of weapons and equipment to our allies, the training of friendly forces in the use and maintenance of United States materiel, and help in the development of military bases, modern weapons, and production facilities.

Since the beginning of the program in fiscal year 1950 the Congress appropriated \$24.0 billion for grant-aid military assistance, of which \$21.4 billion became available for obligation by the Department of Defense after deducting \$2.6 billion for lapsed funds and transfers. Of this total, \$20.8 billion had been obligated or reserved by June 30, 1957, including obligations and reservations of \$1.7 billion placed during fiscal year 1957.

Department of Defense expenditures during this fiscal year amounted to \$2.3 billion and brought total expenditures since 1950 to \$17.2 billion. The Department of the Army expended \$9.8 billion of this amount, the Department of the Navy \$2.0 billion, the Department of the Air Force \$4.8 billion, and the remaining \$0.6 billion was devoted to interservice activities. Our allies, for their part, have expended nearly \$107.0 billion since 1950, contributed substantial manpower and material resources to the common cause, and made base sites available for joint use by allied forces.

Military weapons, equipment, and supplies accounted for more than 87 percent of United States military assistance expenditures—\$15.0 billion—while 6 percent—\$0.8 billion—covered packing, crating, handling, and transportation costs. In addition, the United States made available at nominal cost, to cover repair and rehabilitation, substantial amounts of military items excess to the current needs of our armed forces. The acquisition cost of these items has been estimated at \$1.0 billion, thus bringing total shipments of materiel to about \$16.0 billion. These shipments included nearly 42,000 tanks and combat vehicles, 65,000 artillery pieces, 2,200,000 small arms and machine guns, billions of rounds of ammunition, 1,500 naval vessels, and 12,000 aircraft.

About 15 percent of the expenditure for military weapons and equipment was used for "off-shore procurement"—the purchase of ammunition, aircraft, vessels, and other items produced overseas, principally in European countries and Japan. The placement of or-

ders with foreign producers has stimulated the development of local defense industry, thereby making our allies less dependent upon the United States as the only source of supply in the event of an emergency. At the same time, this procedure produced more defense materiel at less cost to the American taxpayer.

The facilities assistance program aims to meet the same objective by assisting our allies directly in the establishment and expansion of production and maintenance facilities for military equipment. For this program the United States has obligated or reserved \$80 million, of which about \$12 million had been expended by the end of the fiscal year. The contribution by the United States amounts to 49 percent of the cost of the programed plant expansion, while the countries receiving this assistance contribute the remaining 51 percent.

The development of weapons of advanced design in allied countries has been stimulated by United States expenditures of \$37 million, including \$23 million during fiscal year 1957. Assistance under the Mutual Weapons Development Program has been extended to encourage completion for joint use of promising research projects initiated abroad, with particular emphasis on new items especially suited to the needs of allied forces and on those that can be more economically produced overseas than in the United States.

The training of foreign nationals accounted for about \$54 million during fiscal year 1957, bringing total expenditure for this purpose to \$374 million. The training programs are designed to assist allied forces in achieving maximum combat effectiveness at the earliest possible time, to insure the proper maintenance and use of equipment furnished by the United States, and to increase the skills of allied personnel in handling modern equipment scheduled for future delivery. They also build strong bonds of friendship and lead to a valuable exchange of ideas. Allied military personnel completed about 14,000 training courses in the United States during the fiscal year and 5,500 courses offered overseas under American auspices. Since 1950, 119,000 such courses of instruction had been completed. In addition, more than 2,100 mobile training teams and 1,400 technical representatives instructed foreign troops overseas. On June 30, 1957, allied officers and enlisted men were enrolled in almost 6,000 training courses sponsored by the United States.

Countries with adequate financial resources meet their needs for materiel and spare parts by purchase rather than grant aid. As of June 30, 1957, about 60 nations had ordered equipment valued at \$1.1 billion, and deliveries totaled almost \$0.7 billion.

The Department of Defense substantially improved its procedures during the past fiscal year for programing and utilizing military assistance funds. Additional experience permitted a more critical re-

view of the capability of potential recipients to provide the personnel and facilities needed for the optimum use of the assistance furnished. More realistic consumption and usage rates were developed for such items as ammunition and spare parts. The time phasing of military assistance requirements was brought into closer accord with other procurement activities in the Department, thus limiting the need for advanced funding to the minimum feasible lead times.

For fiscal year 1958, the Department of Defense requested the Congress to appropriate \$1.9 billion in new funds for military assistance programs and to permit the carryover of \$0.5 billion from previous appropriations. After the close of the fiscal year, the Congress appropriated \$1.3 billion in new funds for fiscal year 1958 and reappropriated \$0.5 billion in unobligated funds previously made available. This action reduced the proposed program by almost 30 percent and required substantial adjustments in established plans. The President's suggestion to include future military assistance appropriations as a separate title in the regular Department of Defense budget, in recognition of the fact that military assistance is an integral part of our total defense effort, was not acted upon.

During the past 8 years, the military assistance programs of the United States have made an immeasurable contribution to the security of the free world. Without this assistance, free countries in many parts of the world would most likely have succumbed to the communist policy of exploiting situations of weakness. The continuation of military assistance remains essential to the maintenance of the strength that has already been created for the common defense.

### Europe

The North Atlantic Treaty Organization (NATO) has been established with the major mission of preventing war and, should an attack occur, of defending the peoples and territories of its 15 members. The NATO countries are pledged to consider an armed attack against any one of them in Europe or North America as an armed attack against all. This pledge covers more than 450,000,000 people in an area stretching from the "Iron Curtain" to the western boundaries of the United States and Canada.

The defensive strength in this vast area includes the forces specifically committed to NATO commands, backed by the strategic and tactical forces of the member countries. For 8 years this voluntary grouping of sovereign nations has played a strong role in deterring aggression along a 4,000-mile frontier stretching from Norway to the Caucasus. It was able to fulfill this mission because of the tremendous striking power of its strategic retaliatory forces and the readiness of its "shield forces" protecting its eastern frontier under the

Supreme Allied Command, Europe, and guarding its vital communication lines under the Supreme Allied Commander, Atlantic.

In no small measure the NATO achievement in recent years has been a monument to the leadership of Gen. Alfred M. Gruenther, USA, associated with the Allied Command, Europe, since its establishment in 1951, and Supreme Allied Commander, Europe, since 1953. General Gruenther retired in November 1956 and was succeeded by Gen. Lauris Norstad, USAF, who was named by the President at the request of the North Atlantic Council for a United States officer.

During fiscal year 1957, further progress was made in modernizing NATO forces despite the heavy costs involved. The proper balance between the old and the new created problems for NATO similar to those faced at home by each member. The economic burden of defense, complicated by national interests and responsibilities outside of the NATO area, forced some temporary readjustments in military contributions. Despite these difficulties, the inescapable fact of interdependence in face of the common danger provided the basis for a joint effort to resolve the problems encountered. The brutal Soviet suppression of the revolt of the Hungarian people clearly demonstrated once more that neither the aims nor the methods of communist dictatorship had changed.

The NATO ministers at meetings in December 1956 and May 1957 as well as other government officials in many separate conferences explored at length the political, economic, and military problems of the NATO alliance.

At the December 1956 meeting, the North Atlantic Council approved the recommendations of the special Committee of Three to promote closer cooperation between NATO members and directed new military studies on the effects of the new weapons becoming available and of the continued rise in Soviet capabilities. At the meeting of the Council in May 1957, agreement was reached that the availability of the most modern weapons of defense was essential if NATO is to carry out its mission of deterring aggression. At the same time, further military studies were requested regarding the most effective balance between the latest weapons and conventional arms.

The modernization of NATO forces received heavy emphasis in the military assistance programs of the past year. To strengthen combat capabilities against enemy air attack, NIKE guided missiles and Century-series jet aircraft were scheduled for delivery in accordance with NATO-approved priorities. Similarly, allied forces were being equipped with more effective supporting weapons, such as HONEST JOHN rockets and MATADOR and CORPORAL missiles. Although nuclear warheads were not transmitted—in line with

## EUROPEAN NATO DEFENSE EXPENDITURES

(Billions of Dollars)

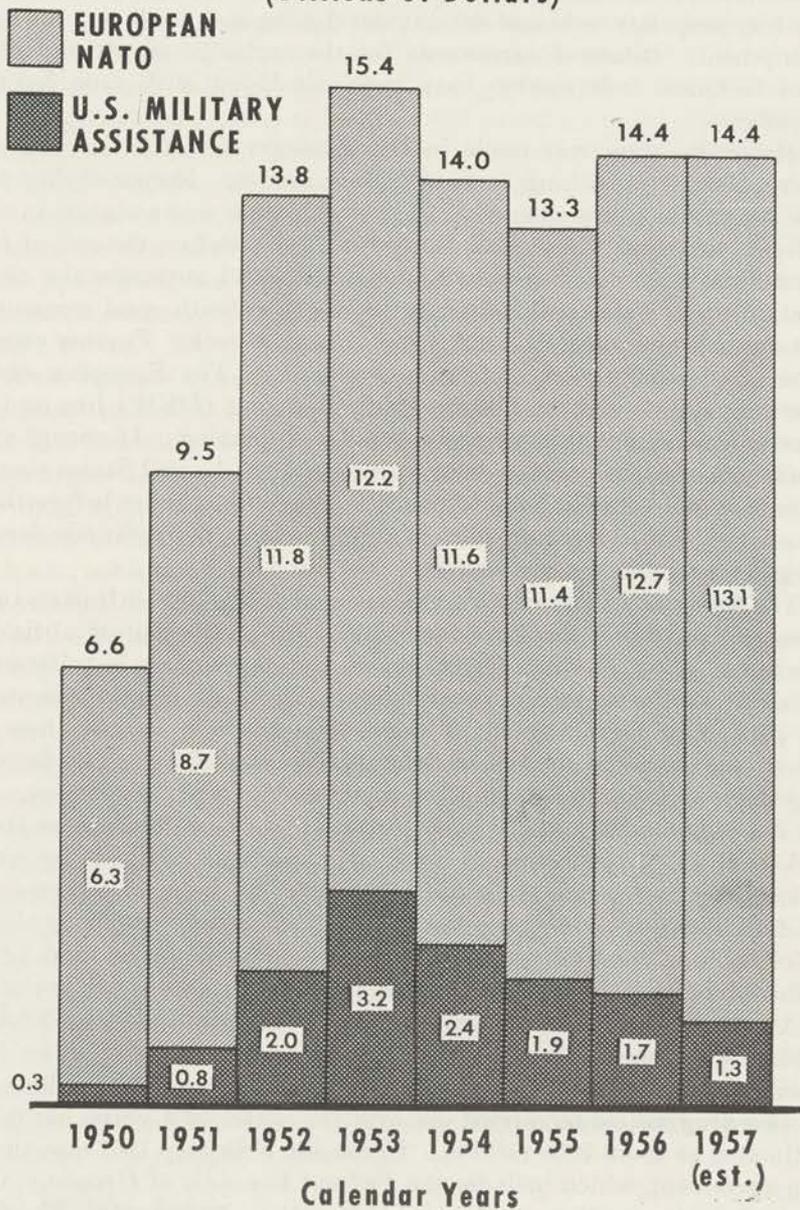


Figure 9.

the current provisions of the Atomic Energy Act—the availability of these weapons provided NATO forces with a greatly increased delivery capability in case of an emergency. In addition, the United States agreed in December 1956 to assist NATO members in advanced research and, by making available certain prototypes together with appropriate technical data, in developing and producing modern equipment. Bilateral agreements for the exchange of patent rights and technical information have been concluded with nine NATO members.

Major progress was made in the development of a coordinated European early warning and air defense system. Responsibility for the construction and operation of such a system was assigned to the Allied Command, Europe, in December 1955. Before the end of the past fiscal year, the Supreme Commander could announce the completion of an integrated network, tied together with good communications and operating 24 hours a day, 7 days a week. Further extension of the line of first detection is planned. The European early warning system and the Distant Early Warning (DEW) line on the North American continent are mutually supporting. If enemy aircraft attempted to hit targets in Europe and the United States simultaneously, they would have to pass the DEW lines hours before they crossed into Western Europe, and thus alert our defensive air forces long before the enemy could strike.

The European early warning net is part of a \$2-billion infrastructure program involving the joint financing and construction of airfields, communications facilities, naval bases, and supporting installations. The United States agreed to contribute to this program approximately 39 percent of its total cost, or about \$780 million. At the close of fiscal year 1957, 160 airfields of the 223 programed for common financing had either been completed or were usable in an emergency. A total of 3,000 miles of petroleum pipelines had been laid—more than twice the mileage available a year ago. Storage facilities for over 375,000,000 gallons of fuels and lubricants had been constructed—a 12-fold increase during the year. In the field of communications, 5,500 miles of land mines, 1,250 miles of submarine cables, and 1,940 miles of radio links had been added to existing civilian networks.

An additional infrastructure program was approved by the NATO Council in August 1956. It placed major emphasis on facilities for survival and retaliation in the event of an atomic attack. The cost of this program, to be carried out over the course of 4 years, has been estimated at about \$630 million. Under the February 1957 cost-sharing agreement, which includes the Federal Republic of Germany, the United States portion of the expenses will be 35 percent. Shortly after the close of the fiscal year, the Congress made available the United States share for the first year's cost of this new program.

The long-planned military contribution of the Federal Republic of Germany to the common defense of Western Europe started to become a reality during the past year. On June 30, 1957, the first three German divisions and a flotilla of minesweepers were ready to be placed under the operational command of the Supreme Allied Commander, Europe. Additional German ground, naval, and air forces were in training. While certain major items of equipment for these new forces have been provided through United States military assistance programs, additional armament will be purchased by the German Federal Government, principally from the United States, the United Kingdom, Canada, and other NATO suppliers. The United States will continue to furnish some training assistance as the buildup of the German forces progresses.

In April 1957, the United Kingdom, faced with serious economic difficulties, announced long-range plans for the readjustment of its armed forces. Major emphasis was placed on the introduction of modern weapons systems and greater mobility together with a compensatory reduction in manpower of about 300,000 men over a 5-year period. Consultations with NATO countries brought some modifications in the timing and the size of the first-year reductions scheduled for units stationed in Europe. Future changes in the British contribution to NATO will be subject to similar discussions.

Spain, not a member of NATO, continued to receive military assistance during the fiscal year to increase its potential contribution to the general defense of the European area in the event of Soviet aggression. In keeping with the 1953 agreement, under which Spain granted the United States the right to construct naval and air facilities, Spanish forces received equipment and weapons from the United States. With this help Spain has been enabled to start the modernization of its ground, naval, and air forces and thus improve the military capabilities of these units. Construction of the six Spanish bases progressed on schedule, and the work was sufficiently advanced in 1957 to permit the United States Strategic Air Command to begin operating aircraft from the Torrejon airfield near Madrid. All air bases are expected to be fully completed during the next fiscal year.

Military assistance to Yugoslavia continued to be subject to careful review during the past year. In accordance with the Mutual Security Act of 1956, the Executive Branch determined on October 16, 1956, that such assistance was still in the security interests of the United States, and the shipment of various items, procured under previous programs, was resumed in May 1957.

### **The Middle East**

The Middle East was beset with increased tensions and conflicts during fiscal year 1957, aggravated by communist efforts to subvert

indigenous nationalist movements to Soviet ends. To meet this threat to Middle East stability and free world security, the United States pursued policies directed toward maintaining peace with justice and assisting independent nations in the area to resist communism.

During the summer and fall of 1956 the United States labored for a just and peaceful solution to the problems arising from the nationalization of the Suez Canal by Egypt on July 26. Before arrangements acceptable to all parties could be devised, Israeli troops invaded Egypt in late October 1956 and Anglo-French forces intervened by seizing the northern terminal of the Canal. Using all available diplomatic channels, including the United Nations organization, the United States worked toward ending hostilities and effecting the withdrawal of belligerent forces. The United States Air Force assisted in the restoration of peace by airlifting troops and equipment of countries contributing contingents to the United Nations Emergency Force.

Further evidence of United States concern for the stability of the Middle East was given when the Congress adopted on March 9, 1957, a joint resolution formally proclaiming the determination of the United States to assist Middle Eastern nations in preserving their independence and integrity. This resolution, proposed by the President, announced the United States intention to use armed forces, in consonance with treaty obligations and constitutional processes, for the assistance of Middle Eastern nations requesting help to meet armed aggression from any country controlled by international communism. In addition, it provided special authorization for economic and military assistance. In keeping with this latter provision, arrangements for military assistance totaling \$51.1 million were concluded with Middle Eastern states during the last 3 months of the fiscal year.

With the help of United States military assistance, the independent nations of the Middle East have improved the capabilities of their forces to maintain internal security and contribute to the collective defense of the area. In particular, Turkey, Iran, Iraq, and Pakistan, linked with the United Kingdom in the Baghdad Pact, are providing a significant deterrent to aggression by strengthening their forces and coordinating their efforts. In March 1957, the United States agreed to increase its support by participating actively in the work of the Military Committee of the Baghdad Pact countries. This participation formally began in June 1957 when a United States military delegation headed by Gen. Nathan F. Twining, Chief of Staff, USAF, attended the meeting of the Military Committee in Karachi, Pakistan. Arrangements were completed at this time for establishing a more comprehensive military planning structure.

A further contribution to the security of the Middle East was provided in April 1957 by an agreement between the United States and

Saudi Arabia to extend their cooperative military arrangements initiated in 1951. The United States, for its part, undertook to provide expanded military training programs and to sell additional weapons and equipment for use by Saudi Arabian forces in defending the independence of their country, while Saudi Arabia agreed to the continued use by the United States of facilities at the Dhahran Airfield over a 5-year period.

### **Asia and the Pacific**

In the Far East, the United States continued during fiscal year 1957 to help independent nations increase their capabilities to resist communist aggression. Assistance under the mutual security programs was extended to those nations desiring aid and willing to use it for maintaining their independence. Since July 1954, the communists have refrained from large-scale military action against free Asia. Instead, they have concentrated on employing political and economic measures to subvert Asian nationalism while, at the same time, steadily increasing their own military potential—particularly on the China coast opposite Taiwan and across the armistice lines in northern Korea and northern Viet-Nam.

The Southeast Asia Treaty Organization (SEATO), established in September 1954 as a bulwark against communist aggression toward the south, further improved its defensive capabilities during the past year. The military organization of SEATO was strengthened in March 1957 with the establishment of a Permanent Military Planning Staff at Bangkok, composed of an equal number of officers from each of the member states—Australia, France, New Zealand, Pakistan, the Philippines, Thailand, the United Kingdom, and the United States. Special meetings were held at various times to coordinate activities in the fields of intelligence and communications. A series of joint military training exercises served to develop teamwork among SEATO military contingents and to improve operational procedures. The pooling of training facilities resulted in substantial increases in the number of well-trained specialists. Additional military equipment and modern operational and training installations were provided through the military assistance program to such SEATO members as Pakistan, the Philippines, and Thailand. The SEATO ministers, at their third annual meeting at Canberra, Australia, in March 1957, stressed the importance of maintaining adequate collective strength in the years to come regardless of any temporary shifts in communist strategy.

Viet-Nam, in the area protected by SEATO although not a member of the organization, continued during fiscal year 1957 to strengthen its internal unity. Its security forces received extensive United States assistance and increased their capability to repel aggression.

The close ties between Viet-Nam and the United States were symbolized by the visit of President Ngo Dinh Diem to the United States in May 1957.

Additional stability and security in the Far East area is being provided by the bilateral defense treaties of the United States with Korea, Japan, and the Republic of China.

In Korea, the continued buildup of communist forces in northern Korea led the United Nations Command to announce on June 21, 1957, that it considered itself no longer bound by the armistice provisions limiting the replacement of old military equipment. The free world was forced to take this step in view of the flagrant and repeated violations of the armistice agreement by the communists, who had equipped their forces with jet aircraft as well as substantial amounts of modern weapons and equipment, thereby upsetting the military balance in the area. As a result of the United Nations action, United States and allied forces will receive more modern and effective weapons until the military balance has been restored and the communists demonstrate by their actions their compliance with the original armistice terms. In support of the forces of the Republic of Korea, the United States continued to station two Army divisions in this important outpost of the free world and to provide military assistance for effective defensive action.

Japan, a major target of communist expansion in Asia, assumed increased responsibility for its own defense during the past year in accordance with its 1951 security treaty with the United States. On June 20, 1957, the President of the United States and the Prime Minister of Japan jointly agreed to a prompt withdrawal of United States ground combat forces from Japan. Reductions in United States naval and air forces will be made as Japanese units become available to undertake the defensive missions currently discharged by American contingents. The buildup of Japanese forces is receiving substantial United States assistance through the delivery of weapons and equipment and the contribution of funds for the development of Japan's military production facilities.

The persistent refusal of the Chinese communists to renounce force as an instrument of their policy, accompanied by substantial increases in their military capabilities, continued to threaten the peace in the Taiwan area. As a countermeasure, the United States provided additional military assistance to the Republic of China to increase the overall efficiency of its ground and air forces. The defensive capabilities of Chinese naval forces were improved with the loan of six warships as replacements for over-age vessels previously in operation. In accordance with an agreement reached in May 1957, a United States Air Force unit equipped with MATADOR guided missiles was stationed on Taiwan.

Reinforcing the defensive capabilities of our allies in the Far East are the highly mobile striking forces of the United States in the Pacific. These units came under the single authority of the Commander in Chief, Pacific, with headquarters in Hawaii, on July 1, 1957. The combination of allied forces and United States military assistance and strategic reserves provides a vital defensive shield enabling the noncommunist governments of Asia to shape their future in continued freedom.

### **The Western Hemisphere**

The United States and its American neighbors continued their close cooperation during fiscal year 1957 in strengthening the common defenses of the Western Hemisphere. Latin American nations received United States weapons and training assistance, thus enabling them to discharge military responsibilities assumed by them under bilateral agreements. Joint action by Canada and the United States improved the capabilities of both countries to counter potential communist attacks across the polar region. These programs benefited all participants and resulted in a considerable increase in the strategic security of the entire hemisphere.

United States military assistance has been extended to the 12 Latin American countries that agreed in bilateral arrangements to participate in specific joint security missions, such as the protection of sea lanes and communication lines and the defense of strategic areas against sea or air attack. By June 30, 1957, grant aid to these countries totaled more than \$120 million, not including excess stocks valued at about \$86 million.

In addition, Latin American countries purchased weapons and equipment to the amount of \$83 million during the past 7 years. Future sales of spare parts and military end-items will be facilitated as a result of congressional permission, granted shortly after the close of the fiscal year, to use repayments on earlier credit sales for the financing of new ones.

Training assistance and military advice has been provided to Latin American countries for many years through Army, Navy, and Air Force missions stationed in these countries. The number of such United States missions rose to 40 during the fiscal year with the reestablishment in October 1956 of the Air Force mission to Argentina.

Latin American military personnel are also trained in regular Service schools in the United States and in special training courses in the Caribbean region offered by the Army and the Air Force. Modern methods of antisubmarine warfare were demonstrated by a group of United States Navy ships on a good-will tour in South

American waters. These naval units also participated in combined exercises with ships of the host countries.

In addition, the American Republics continued to cooperate in many other ways for the common security. Brazil, for example, agreed in January 1957 to make available to the United States a site on the island of Fernando de Noronha for the installation of a guided missile tracking station. This base will greatly facilitate the testing of long-range ballistic missiles by the United States. Colombia, which had contributed troops to the United Nations Command in Korea, again answered the call of the United Nations by providing a contingent for the special emergency force being dispatched to the Middle East. In May 1957, military representatives of Argentina, Brazil, Paraguay, and Uruguay took the initiative of developing regional plans, within the overall framework established by the Inter-American Defense Board, for the joint defense of the South Atlantic area. Actions of this type give additional validity to the 1947 Inter-American Treaty of Reciprocal Assistance, whereby all American Republics are pledged to treat an attack against any one of them as an attack against all.

To the north, the existing close collaboration between Canada and the United States continued during fiscal year 1957. Construction of the DEW line across northern Canada significantly improved the capability of the air forces of both countries to intercept enemy intruders promptly and effectively. Plans for even closer coordination of joint air defense efforts were being completed toward the close of the fiscal year. Canada, like the United States, is also a partner in the North Atlantic Treaty Organization and has contributed to the general security not only by stationing troops in Europe but also by providing nearly \$1.5 billion's worth of military materiel and training assistance to NATO nations during the past 7 years.

## V. Conclusion

The outstanding defense development during the past 4 years has been the rapid modernization of our armed forces. This modernization brought a major increase in the striking power of each of the military Services and was accompanied by a selective reduction in the number of military personnel.

A 1953 review of military programs and the world situation indicated that major changes in our military policy were required. Among the factors that entered into this decision were the prospect of entirely new weapons systems in the not too distant future, the Korean armistice of July 1953 which cancelled some of the special requirements for ground and naval units created by the Korean hostilities, and the additional protection against aggression provided by the recent increases in the defensive strength of our allies.

As a result of these considerations, realistic programs for the long-range security of our country were adopted. With the basic objective of preserving world peace, they provided adequate insurance at a reasonable cost against both total and limited aggression. In order to assure effective defenses not only today but also in future years, these programs were periodically adjusted to reflect the accelerating scientific and technological developments of our age.

The introduction of new weapons systems gave greatly increased capabilities to combat units of all types, while flexibility for non-nuclear warfare was retained. At the same time, major adjustments were made in the composition and size of our armed forces.

Between June 1953 and June 1957, active duty personnel in the armed forces decreased by nearly 760,000 men—from 3,555,000 to 2,796,000. The Korean armistice made possible a large part of the early reductions, and the greater effectiveness and firepower of new weapons accounted for most of the reductions in more recent years.

During the same period, nuclear weapons for strategic use became much more powerful and abundant and simultaneously were adapted for tactical use. Equally important, delivery systems were greatly improved.

In June 1953, the Air Force's active aircraft inventory of 19,000 planes included only 32 percent jets. By June 1957, the total number of planes had risen to 26,000 and the jet percentage to 60. In the Navy, with somewhat different requirements, the jet percentage increased from 20 to 38 during the same period. Deliveries of Century series aircraft, replacing earlier subsonic jets, will give the Air Force a completely supersonic fighter inventory in the near future. The replacement of the propeller-driven B-36 by the all-jet B-52

was started in fiscal year 1956 and will be completed in fiscal year 1959.

The past 4 years also saw the first guided missiles becoming operational. The Army's surface-to-surface CORPORAL was made available to tactical units in 1953, followed in 1954 by the Army's surface-to-air NIKE-AJAX and the Air Force's surface-to-surface MATADOR. In 1955 the Navy attained an operational capability for its air-to-air SPARROW, its surface-to-surface REGULUS, and its surface-to-air TERRIER, while operational deliveries of two air-to-air guided missiles, the Navy's SIDE-WINDER and the Air Force's FALCON, and the Navy's air-to-surface PETREL were made in 1956.

A second generation of greatly improved missiles is under development with schedules calling for early deliveries. Intermediate range and intercontinental ballistic missiles were assigned the highest national priority in 1955, and the progress made since then promises that the usual lead-time for the development of major weapons will be greatly reduced in this case.

The introduction of new weapons also brought changes in the combat organization of the military Services and a need for new installations, ships, and bases. The Army developed the Pentomic division concept to meet the requirements of both nuclear and non-nuclear warfare. Three new "supercarriers," capable of handling the most modern naval aircraft, were launched by June 1957, while 3 more were under construction. A new age in ship propulsion opened in 1954 when the nuclear-powered *Nautilus* submarine joined the fleet, and the world's first guided missile cruiser, the *Boston*, was commissioned in 1955. Since then, another nuclear-powered submarine and two guided missile ships were completed, and approved programs call for the construction of ships of both types in substantial numbers. Marine divisions have become more mobile, faster, and equipped with greater firepower. New air bases were constructed and existing ones improved as additional Air Force wings were activated and more modern aircraft delivered. The introduction of guided missiles to supplement the striking power of manned aircraft was reflected in adjustments in the wing structure of the Air Force.

These new and complex weapons placed increased emphasis on the continued availability of thoroughly trained manpower. The Career Incentive Act of 1955, accompanied by various other personnel measures, constituted a major step toward meeting this requirement and was followed by the studies of the Cordiner Committee, whose recommendations were under review at the close of the fiscal year. The Department's success in attracting and retaining more capable officers and men will determine to a large degree the future effectiveness of our armed forces.

As an additional measure to discourage aggression, major improvements were made in our continental defense system. The DEW line was constructed to supplement the mid-Canada and Pine Tree early warning systems. High speed electronic computers were installed to permit the instant analysis of combat information. A single command was established to coordinate all units assigned to the continental defense mission.

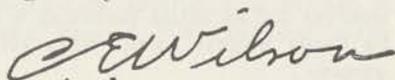
Simultaneously, the reserve establishment was streamlined to provide a well-trained, readily available reserve of adequate size and improved quality. The Reserve Forces Act of 1955 made it possible to increase the proportion of younger men in the reserve, assure greater equity to combat veterans, and establish in case of emergency a fair division of technically trained personnel between industry and the armed forces. The fact that the number of reservists in drill pay status increased from 578,000 in June 1953 to 1,000,000 in June 1957 reflects part of the improvement that has been made in the readiness of our reserve components.

A vital and integral part of our national security has been, and continues to be, the contributions of our allies to the defenses of the free world. The maintenance by friendly nations of substantial ground, sea, and air units, ready to cooperate in an emergency with our own armed forces, has been a major factor in reducing the threat to world peace. Without this joint undertaking, the size, composition, and cost of the United States defense programs would have had to be greatly modified.

As a result of all these efforts, we have had during the past 4 years effective defenses against any type of aggression and laid sound foundations for keeping our military strength adjusted to the rapid technological developments of our age.

The cost of these programs has been necessarily high, but it was kept at a manageable level by careful planning. Each major project was carefully reviewed in relation to our total defense program. These reviews made it possible to assign realistic priorities to the size as well as the timing of the effort to be expended in each case.

Adherence to these procedures established an effective balance between the forces required to counter the dangers of the cold war, limited aggression, and massive nuclear attack and between expenditures for current weapons systems and for those of future years. At the same time, these procedures provided the necessary security at a reasonable cost. With timely adjustments, they will enable us to meet successfully whatever new challenges may arise.



C. E. WILSON,  
*Secretary of Defense*

SEMIANNUAL REPORT  
of the  
RESERVE FORCES POLICY BOARD

June 30, 1957

The Semiannual Report of the Reserve Forces Policy Board on the status of the reserve programs of the Department of Defense, as required by Section 257 (e) of the Armed Forces Reserve Act of 1952, as amended, is submitted for the period ending June 30, 1957.

The Reserve Forces Policy Board held three meetings during fiscal year 1957, studying the reserve forces programs and making recommendations to the Secretary of Defense on matters of policy and legislation affecting the reserve forces. During the final 6 months of the year, members of the Board's staff visited various reserve activities in the field for firsthand observation of reserve training and facilities. Since January 1, 1957, the following changes in the membership of the Board have been made:

Maj. Gen. Carl L. Phinney, NGUS, relieved Maj. Gen. J. C. Henagan, NGUS.

Col. John L. Winston, USMCR, relieved Maj. Gen. Karl S. Day, USMCR.

Maj. Gen. William H. Harrison, NGUS, relieved Maj. Gen. K. F. Hausauer, NGUS.

Maj. Gen. Stanford W. Gregory, ANGUS, relieved Maj. Gen. L. C. Ames, ANGUS.

Maj. Gen. Theron B. Herndon, USAFR, relieved Brig. Gen. R. J. Smith, USAFR.

Rear Adm. J. McN. Taylor, USN, relieved Vice Adm. J. L. Holloway, USN.

Maj. Gen. Richard A. Grussendorf, USAF, relieved Lt. Gen. W. E. Hall, USAF.

Maj. Gen. F. A. Warren, USAR, relieved Maj. Gen. G. H. Olmsted, USAR.

## Personnel

The Ready Reserve changes in numbers enrolled and in numbers in drill pay status, for officers and enlisted men, are indicated in Table No. 1 for each component. Table No. 2 indicates for the Ready Reserve the total actual paid participation strengths by component for the end of fiscal year 1957 in comparison with current Secretary of Defense-designated end goals for fiscal years 1957 and 1958.

### *The Reserve Forces Act of 1955*

The principal deficiency of the Reserve Forces Act (RFA) of 1955, in the opinion of the Reserve Forces Policy Board, was the absence of any provision to guarantee a steady input into the Ready Reserve components of basically trained young men who were otherwise without prior service. Both before and since enactment of this Act, the Board has contended that the best way of assuring this input was to induct young men without prior service directly into the reserves for an initial period of 6 months' active duty for training, followed by Ready Reserve service when voluntary enlistments fail to meet prescribed quotas.

In the absence of an induction provision in the Reserve Forces Act, an unprecedented peacetime recruiting campaign was conducted by the United States Army Reserve to secure voluntary enlistments under Section 262 of the Act, which required an 8-year enlistment, with draft deferred status for individuals between 17 to 18½ years of age, to include 6 months' active duty for training and 7½ years' participation in the Ready Reserve. In the final months of 1956, it became apparent that the recruiting efforts would not produce the numbers desired in this category.

Furthermore, the United States Army National Guard (ARNGUS) and the Air National Guard of the United States (AFNGUS), both components of the Ready Reserve, were exempted from the special enlistment programs of the Act and were dependent solely upon voluntary agreements with enlistees to undergo a full 6-month program of basic training after their enrollment. Consequently, the ARNGUS and the AFNGUS had no assured input into their components of basically trained young men.

In recognition of the impairment to the readiness of the reserve forces caused by this input deficiency, the Secretary of Defense in his memorandum of November 26, 1956, directed that after April 1, 1957, all new accessions to the reserve components not basically trained would be required to enter on active duty or active duty for training shortly after enlisting. The ARNGUS felt that requiring the established 6-month active duty for training agreement from all nonprior service enlistees would jeopardize its capability to maintain the Guard at authorized strength. The result of hearings held before Subcommittee Number One of the Committee on Armed Services of the House of Representatives on this issue was a memorandum of understanding regarding the Army National Guard and the Army Reserve 6 months' training program. Major points covered therein were agreements that—

a. Until January 1, 1958, persons between the ages of 17 and 18½ may enlist in the National Guard for 11 weeks of active training and the remainder of the unexpended portion of the obligation is to be spent in the National Guard (Ready Reserve), where active participation will be required, provided persons entering the 11 weeks training program must have enlisted in such program on a date sufficiently prior to January 1, 1958, to insure completion of 11 weeks of training by January 1, 1958.

b. "Persons within the age group 17 to 18½ who voluntarily perform 6 consecutive months active duty training will only be required to serve 3 years in addition to and following the completion of the 6 months active duty for training in the National Guard (Ready Reserve) where active participation will be required. At the end of that period they may be transferred to the Standby Reserve for the remaining 4½ years of their total 8-year obligation. It is understood, however, that these young men may remain in the National Guard, if acceptable, and if they volunteer to do so.

c. "Not later than January 1, 1958, all persons enlisting in the National Guard between the ages of 17 and 18½ will be required to perform 6 months of active duty for training, and the 11 weeks active duty training course will be discontinued. The Ready and Standby Reserve obligations will be the same as set forth in the foregoing paragraph, 6 months active duty for training, 3 years Ready Reserve and 4½ years Standby Reserve.

d. "Persons between the ages 18½ through 25 entering in the National Guard will be required to perform 6 months of active duty training to be followed by 5½ years service in the National Guard (Ready Reserve) where active participation will be required."

TABLE 1. READY RESERVE (NOT ON ACTIVE DUTY)

	June 30, 1956		December 31, 1956		June 30, 1957	
	Total	Drill pay status	Total	Drill pay status	Total	Drill pay status
National Guard.....	420, 535	404, 403	418, 790	403, 545	441, 798	422, 178
Officers.....	40, 010	34, 899	41, 232	36, 091	41, 801	36, 795
Enlisted.....	380, 525	369, 504	377, 558	367, 454	399, 997	385, 383
Army Reserve.....	1, 917, 250	197, 340	1, 814, 333	**225, 345	1, 008, 438	**260, 377
Officers.....	147, 812	68, 588	154, 576	72, 239	152, 308	73, 308
Enlisted.....	1, 769, 438	128, 752	1, 659, 757	153, 106	856, 130	187, 069
Naval Reserve.....	428, 617	#150, 193	476, 570	#143, 471	463, 188	141, 747
Officers.....	83, 869	26, 607	91, 588	27, 467	77, 190	27, 728
Enlisted.....	*344, 928	123, 586	*384, 982	116, 004	*385, 998	114, 019
Marine Corps Reserve.....	210, 017	#43, 156	224, 585	#43, 633	239, 898	46, 150
Officers.....	13, 606	3, 984	12, 669	4, 039	12, 691	4, 106
Enlisted.....	*196, 411	39, 172	*211, 916	39, 594	227, 207	42, 044
Air National Guard.....	63, 534	63, 534	64, 880	64, 880	67, 950	67, 950
Officers.....	7, 300	7, 300	7, 777	7, 777	8, 033	8, 033
Enlisted.....	56, 234	56, 234	57, 103	57, 103	59, 917	59, 917

Air Force Reserve	287, 731	54, 211	317, 958	56, 313	217, 846	**61, 677
Officers	97, 606	30, 438	82, 377	29, 511	45, 699	32, 759
Enlisted	190, 125	23, 773	235, 581	26, 802	172, 147	28, 918

\*Includes Officer Candidates.

#Includes Standby Reserves in drill pay status.

\*\*Excludes personnel reported by units in 6-month active duty for training.

Figures for June 30, 1957, include attrition resulting from screening in compliance with Section 208 (k), Reserve Forces Act 1955.

TABLE 2. PAID PARTICIPATION READY RESERVE (NOT ON ACTIVE DUTY)

	June 30, 1957			Reserve plan goals June 30, 1958			
	Total strengths ready reserve	Number in drill pay status	Authorized drill pay strengths	Number in paid annual training only	Total strengths ready reserve	Number in drill pay status	Number in paid annual training only
Army National Guard	***441, 798	422, 178	**425, 000	---	**400, 000	400, 000	---
Army Reserve	1, 008, 438	260, 377	255, 900	3, 427	1, 048, 000	300, 000	29, 650
Naval Reserve	463, 188	141, 747	150, 000	14, 000	530, 000	150, 000	14, 000
Marine Corps Reserve	239, 898	46, 150	47, 000	190, 596	208, 000	48, 000	160, 000
Air National Guard	67, 950	67, 950	68, 600	---	73, 000	73, 000	---
Air Force Reserve	217, 846	*61, 677	62, 575	4, 902	245, 950	73, 400	4, 090

\*Excludes those on active duty for training.

\*\*Enrolled strength authorized.

\*\*\*Includes 19,620 inactive National Guard.

e. The size of the Army National Guard shall be maintained at an authorized strength of approximately 400,000 for the remainder of fiscal year 1957 and for fiscal year 1958 and thereafter at such greater or lesser strength as may be determined in annual appropriations of the Congress and that every means will be used to maintain the Guard at approximately the determined figure.

f. Certain other stipulations were set forth in the memorandum covering special categories of personnel and details of implementation. The Army Reserve was also made eligible for these special enlistment programs.

The response to these new enlistment agreements under Section 262 of the Reserve Forces Act was gratifying. Enlistment rates in both the Army National Guard and the Army Reserve rose to new highs. Whereas enlistments of non-prior service personnel under the provisions of the Act totaled 30,784 during the first 6 months of the fiscal year, the total from that time until May 14, 1957, when Section 262 enlistments were suspended, totaled 37,300. Another 23,349 men who affiliated with the Army Reserve during this period under other enlistment terms agreed to undergo 6 months' active duty for training. These acquisitions in the reserve components of the Army posed numerous training and serious budgetary problems which will not be completely resolved until well into fiscal year 1958.

The immediate results of the memorandum of understanding were generally beneficial to the Ready Reserve. As noted above, the Army reserve components were rapidly augmented with nonprior service enlistees. In addition, this memorandum was a step forward in placing these service components on a more equitable basis with respect to the procurement of men without prior service. However, just what the long-range effects will be on enlistments in the regular Service establishments and on the reserve components of the other Services which have not adopted the modified enlistment agreements remains to be seen. It is anticipated that there may be some adverse effects felt in the Reserve Officer Training Corps and other officer procurement programs. Reducing the Ready Reserve participation requirement to 3 years for enlistees in the 17- to 18½-year group and extending the 6-month training program to include 18½ to 26 year old men are, in the opinion of the Board, deviations from the Reserve Forces Act program as originally implemented. Such changes could create wide dissatisfaction among present reservists whose enlistment agreements were less favorable in terms of the active military obligations. The Board feels, however, that an accurate appraisal of the enduring effects generated by the memorandum of understanding on the entire Ready Reserve picture will not be possible until reports covering all facets of the reserve program are available for evaluation. It therefore defers judgment on the expediency of this understanding pending receipt of such additional information.

The National Security Training Commission under Section 262 (e) of the Reserve Forces Act of 1955 was charged with the responsibility of formulating a code, or program, containing recommendations for the personal safety, health, welfare, and morals of the members of the Ready Reserve enlisted under this section (17 to 18½ year olds) while performing active duty for training, including regulations concerning the dispensing of alcoholic beverages on training establishments, in conformity with the laws of the several states. On June 30, 1957, the activities of the Commission were terminated at the request of the commissioners themselves and with the approval of the President. Under the guidance of the code, which they established, the commissioners felt the separate Services could now adequately exercise such supervision as would militate to the best interests of the reserve programs and the individuals themselves.

Likewise on June 30, 1957, enlistments in reserve components under Section 263 of the Act were discontinued in accordance with the termination provision

therein. In general, Section 263 (a) permitted the release of individuals from active duty in the armed forces prior to serving the periods for which inducted or enlisted, but in no case before serving a minimum of 12 months, if those individuals were on active duty in the armed forces on the date of enactment of the Reserve Forces Act of 1955, and provided they volunteered for transfer to an approved unit of the reserve components. Transferees were required to participate satisfactorily in the Ready Reserve for a period which when added to the period of their active duty totaled 4 years. This arrangement was known as the "early release" program. Section 263 (b) permitted 1-year enlistments of individuals in approved units of the reserve components released from active duty after the date of enactment of the Reserve Forces Act of 1955. Persons so enlisted were required to participate satisfactorily in the Ready Reserve. Both of these special enlistments were intended to facilitate the rapid buildup of prior service personnel in the Ready Reserve. In view of the recruiting "freeze," the improved level of experience now existing in all components of the Ready Reserve over that obtaining on the date the Act was enacted, and the existence of the still effective paragraph 4 (d) 3 of the Universal Military Training and Service Act of 1948, as amended, which provides for "pre release" from the armed forces, the Board has not recommended extension of the authority for these special enlistments.

The first cycle of the screening process being conducted by the Services in conformance with Section 208 (k) of the Act, to transfer to the Standby Reserve from the Ready Reserve those not immediately available or needed on mobilization, has been virtually completed. On June 30, 1957, a total of 3,759,677 officers and enlisted men had been screened and 2,371,594 of this number, or 63 percent, have been retained in the Ready Reserve. This screening is a continuous process and will be repeated each year to determine the current status of all members of the Ready Reserve.

As previously indicated by the Board, the provision in the Act which reduced the military obligation from 8 to 6 years, with certain exceptions, will impair the capability of some Service components to meet planned mobilization strength requirements at a future date and when 8- and 6-year enlistments expire simultaneously. Despite the alleviating effects of the Secretary of Defense's directive of November 26, 1956, prescribing new and reduced goals for all components and the prospects of further reductions in the inactive reserve forces, the Board believes that plans should be formulated now to circumvent any envisioned serious shortages in the Ready Reserve strengths.

#### *The Reserve Officer Personnel Act of 1954*

In order to increase the effectiveness of the Reserve Officers Personnel Act (ROPA) of 1954 and to insure equitable and fair treatment of all categories of reserve officers, unit and nonunit, on active and inactive duty, special branch and regular branch, the Reserve Forces Policy Board has proposed several modifications to the Act which have been recommended as legislative amendments. Most of these modifications are of a minor, technical nature aimed to clarify certain passages in the Act or to eliminate unfair and unintended discrimination against a particular group or category of officers. One of the suggested amendments, however, is of major concern to the Air Force reserve components because of undesirable results obtained by this Service in administering a provision of ROPA. The cause of the trouble is the effect produced by the so-called "pusher clause" in the mandatory promotion system. As a result of this clause a large number of reserve officers have been promoted to the grades of major and lieutenant colonel much earlier than was intended, thus creating overages in these grades. In addition, many of these officers have been prematurely promoted

out of Ready Reserve units in which no billet is available to them in their higher grade. The amendment to ROPA proposed for this case will serve to rectify the objectionable condition. It can be expected that additional shortcomings in the Act will become apparent with its continued implementation and that additional amendments will be proposed. While the Board feels that deficiencies in the original provisions of ROPA have caused some inequities and injustices to reserve officers, it believes that the Act has been effective, on the whole, in accomplishing its objective and that existing amendments, proposed by the Board, if adopted, will further enhance this effectiveness.

## The Reserve Components

### *The Reserve of the Army—Organization*

In an effort to improve and strengthen the United States Army reserve program, a plan was initiated in the Second Army area, beginning on July 1, 1957, which will consolidate the 8 military districts into 2 U. S. Army Corps (Reserve). Consolidation of these military districts will serve as a field test for the other Army areas. Success of the program in the Second Army area will determine whether or not it will be extended throughout the continental United States. The primary goal of the consolidation is the improvement of Army Reserve training, operation, and control by assigning responsibility to an active Army organization created specifically for that purpose.

### *The Army National Guard*

The aggregate strength of the Army National Guard as of June 30, 1957, was 422,178 exclusive of 19,620 in an inactive status. This total was 67.5 percent of that authorized for the 5,493 Federally recognized units among which this strength was distributed and was 2,822 under the budgetary ceiling of 425,000. Present authorized strengths for Army National Guard units is full officer strength and reduced enlisted strength of 85 percent of full TOE, but this has been limited annually by the appropriations approved in Congress.

Approximately 83 percent of the officer and 16.5 percent of the enlisted Army National Guard strengths have had prior service or 6-month active duty for training. Major efforts have been made during the past year to improve the individual training level of the enlisted personnel of the Guard. One of the most important measures which has been adopted to produce this improvement in quality is the new requirement that all nonprior service personnel enlisting in the Army National Guard after April 1, 1957, will be obligated to undergo an initial period of active duty for training. Effective implementation of this measure is already reflected in the fact that since April 1, 1957, 13,768 (12,749—6-month; 1,019—11-week) National Guardsmen have entered basic training. The average current enlisted turnover rate is still close to 30 percent of which more than one-fourth represents enlistments in the active armed forces.

Training activities continue at a satisfactory level, with commendable performance in many segments. The average attendance at paid drills for officers was 94.4 percent and for enlisted personnel was 87.6 percent. The large number of nonprior service accessions during the period covered by this report has required the continued concentration of training efforts on individual rather than unit training. During the coming year the return to their units of personnel who have undergone their basic training and the expected influx of prior service men who have a remaining military obligation should furnish the Army National Guard the experience needed to permit greater unit training activity. There are 1,516 officers and 3,838 enlisted personnel of the Army National Guard

serving on active duty and they constitute about 1 percent of the officer and less than 1 percent of the enlisted total active Army strengths.

#### *The Army Reserve*

The United States Army Reserve has organized in an active status 5,581 of the 7,320 authorized company-size units. Assigned to these units are 260,353 individuals as opposed to TOE and TD authorizations of 655,900. Those participating in a drill pay status number 260,377, which figure slightly exceeds the original goal of 255,900 for the end of fiscal year 1957. The total Ready Reserve strength of 1,008,438 is less than the end goal for fiscal year 1957 of 1,023,000, partly as a result of the screening process which is being implemented. No difficulty, other than budgetary limitations, is foreseen which will prevent eventually reaching the desired end goal strength.

The number of United States Army reserves carried on the rolls in a non-participating status as individual reinforcements to the Army National Guard and Army Reserve units totals 217,558. This number is adequate to meet the needs of individual reinforcements for priority units selected for early deployment but is insufficient for bringing nonpriority units up to authorized strengths in the present troop structure. In addition to the foregoing numbers of emergency reinforcements to reserve units, there are 141,730 reinforcements for the active Army pool to be utilized as trained fillers and combat loss replacements during 6 months following M-day. This pool is insufficient to meet the present requirement but with inactivation of noneffective units and new accessions to the Army Reserve, the pool should be filled within the next 6 months. A reevaluation of the Emergency Reinforcement Plan is being made by the Army Staff. Emphasis will be placed on having available a pool of reinforcements matched by military occupational specialty with existing needs.

Training in the United States Army Reserve continues at a satisfactory level and the conduct of individual and small unit training continues to improve. Participation at paid drills during the past 6 months was 88 percent for officers and 77 percent for enlisted men. The turnover rate for all personnel was 12 percent. Revised personnel programs have produced the largest reserve component training loads in history. A total of 39,329 Army reserves entered training during this period. Approximately 89 percent of the assigned Army Reserve strength are prior service personnel with active Federal service. This represents an increase of 14 percent for personnel in this category during the last 6 months and should permit steady training progress toward the mobilization readiness objective. Since the inception of the screening program, the Army has screened from the Ready Reserve, either by discharge or by transfer to the Standby Reserve, in excess of 1,000,000 reservists. Within the Standby Reserve are 13,559 officers and 761,031 enlisted personnel. There are 77,223 officers and 45,556 enlisted men of the Army Reserve serving on active duty, and they constitute 69 percent of the officer and 5 percent of the enlisted total active Army strengths.

#### *The Naval Reserve*

The on-board strength of the Navy Ready Reserve as of June 30, 1957, was 77,190 officers and 385,998 enlisted personnel. This total of 463,188 represents approximately 87 percent of the prescribed end goal for fiscal year 1958 of 530,000. Those in drill pay status numbered 142,120 or approximately 95 percent of the 150,000 authorized for the end of fiscal year 1957. As a direct result of the continuous screening process, the number of Ready Reserve officers showed a net decrease of more than 6,000 under the June 30, 1956, total. As young officers are released after completing their obligated tours of active duty

during fiscal year 1958, they will increase the number of Ready Reservists on inactive duty to the planned requirement of 80,000. Almost all Ready Reserve officers will have had several years' experience on active duty, and there is a good matching with the skills required on mobilization. Enlisted strength of the Navy Ready Reserve gained during the fiscal year. The June 30, 1957, total is 84 percent of the estimated requirement of 450,000 which should be reached during fiscal year 1958, with the release from active duty of men who have served for 2 or more years and who are still under a military obligation.

For nonprior service acquisitions, the Ready Reserve continues to rely mainly on the special enlistment program provided under Section 261 of the Reserve Forces Act which requires a 6-year enlistment and obligates the individual so enlisted to serve 2 of these years on active duty. Beginning late this year the first enlistees under this plan will return to civilian life and those having demonstrated the most aptitude for the service will be urged to enter the paid drilling units to fulfill their remaining military obligation. Returning obligors who do not affiliate with drill pay units will still enhance the mobilization readiness of the Ready Reserve as it is felt that the abilities developed in active service assure an effective performance for the time the individual remains under his military obligation. Enlistments under Section 262 of the Act which provides a 6-month training program for men possessing certain critical skills were discontinued during the latter part of the fiscal year because of budgetary limitations. Efforts to improve the quality of the Ready Reserve resulted in 29,600 advancements in rating last year for enlisted men in the drill pay units. At the present time, 45 percent of the men hold petty officer rates but there remains a shortage in the more senior petty officer groups.

Emphasis on quality of training and readiness for immediate response on mobilization have characterized both the Air and Surface Naval Reserve programs during the past 6 months. Substantial progress has been made in the development of well-trained and quickly available Ready Reserve forces, organized to perform specific missions. Average participation in paid drills for the last 6 months has been 91.4 percent for officers and 89.6 percent for enlisted personnel in Surface Reserve units. In the Air Reserve units, participation was 90.8 percent for officers and 83.9 percent for enlisted men. The turnover rate in personnel in paid drill programs has been about 35 percent of total drill pay strengths. This is largely the result of reservists leaving the program for 2-year active duty tours. New enrollments, however, have compensated for these losses. Standby reserves totaled 66,300 officers and 16,900 enlisted men on June 30, 1957. There are at present 29,002 officers and 62,648 enlisted personnel of the Naval Reserve on active duty, and they constitute 39 percent of the officer and 10 percent of the enlisted total active Navy strengths.

#### *Marine Corps Reserve*

On June 30, 1957, the total strength of the United States Marine Corps Ready Reserve was 239,898 as opposed to the assigned fiscal year 1958 end goal of 208,000. As the present Ready Reserve strength provides 65 percent of the officer and 117 percent of the enlisted mobilization requirement, further adjustment will be required through acquisitions and screening to conform to the mobilization objective. The drill pay reserve totaled 46,150 as compared to the budgetary ceiling of 47,000, and this strength was distributed among 242 ground, 67 aviation, and 19 women platoon units. Both sections 261 and 262 of the Reserve Forces Act of 1955 are being used to enlist the required input of non-prior servicemen in the reserve organization. In addition, a new 6-month training program to enlist male applicants between the ages of 18½ through 21 years for a 6-year enlistment has been established and is progressing very successfully.

The proportion of prior service personnel with 6 months' or more active duty who are participating in the Ready Reserve is 31 percent. A realistic appraisal of gains and losses indicates a turnover rate of about 20 percent. The retention ratio of 5 to 1 points up the fact that the drill pay reserve is approaching the stability of personnel that is necessary in order to produce an integrated and progressive training cycle. The obstacle of adequate officer procurement has not been completely overcome. Shortages in the number of pilots available and in certain specialist fields create a mobilization problem. Future phase-outs from the Regular establishment should eventually solve the pilot shortage and phase-outs along with new training concepts should serve to correct the specialist deficiency. As a result of the screening process being conducted in accordance with Department of Defense directives, 230,191 Ready Reservists, or 91 percent of the total screened were retained in the Ready Reserve.

The major problem confronting the Marine Corps Reserve is the lack of funds to conduct all of the training considered necessary to attain the desired state of readiness. Despite obstacles encountered, however, improvement in the stability and quality in both the drill pay and nondrill pay Marine Corps Ready Reserve has been experienced and should continue. Participation at paid drills in both air and ground units for the past 6 months has averaged 92 percent for officers and 74 percent for enlisted men. The overall training readiness of the Ready Reserve as computed by classified formula is 85 percent.

On June 30, 1957, 15,412 officers and 12,533 enlisted men were serving in the Standby Reserve. Marine reservists on active duty as of the same date totaled 6,040 officers and 34,316 enlisted men, and they constituted 35 percent of the officer and 18 percent of the enlisted total active Marine Corps strengths.

#### *The Air National Guard*

The strength of the Air National Guard on June 30, 1957, was 8,033 officers and 59,917 airmen as opposed to the current authorized strength of 11,100 officers and 78,500 airmen when all units have been activated. Present strengths represent an increase of 256 officers and 2,814 airmen since December 31, 1956. Manning in the Air National Guard is adequate although some difficulty still exists in procuring sufficient navigator and radar observers. A continuous effort has been made to induce all nonprior service airmen to voluntarily take the 11-week basic training course or 6-month active duty for training. The response has been encouraging and the experience gained by these trainees will further improve readiness in their units.

All flying units of the Air National Guard are activated with the exception of 1 Aeromedical Transport Squadron, Light, which is programed for fiscal year 1958. Combat units total 27 wings, consisting of 2 tactical reconnaissance wings and 25 fighter-interceptor wings. There are 2 separate additional squadrons. Support units (flying) are of three types and total 9 squadrons. The state of training is considered satisfactory with the operational readiness of combat units improving except in those units which are in the process of converting to later model aircraft. There has been no increase in the number of fighter squadrons standing daylight runway alerts with the Air Defense Command during the past 6 months. The Air National Guard Control and Warning Unit in Hawaii continues to provide the Air Force with 24-hour-a-day coverage. Two additional control and warning units in Denver, Colorado, and Salt Lake City, Utah, are now manned by the Air National Guard and will also provide around-the-clock coverage for the Air Force in the near future. Utilization of the 36 additional drills which were authorized late in fiscal year 1956 for air crew members has increased the proficiency of individuals. This improved performance is reflected in the fact that although flying time during

the past year has increased 30 percent, the accident rate has decreased approximately 40 percent. Each Air National Guard unit conducts 48 unit training assemblies annually. Participation in these assemblies has been on an average of 94 percent for the officers and 89 percent for the assigned airmen. In fiscal year 1957, approximately 94 percent of the personnel attached to units which performed the 15 days' annual field training were with their organizations at the training sites. There are 874 Air National Guard officers, 13 Air National Guard airmen, and 572 aviation cadets, training on Air National Guard quotas, serving on active duty with the Air Force. These officers constitute 1 percent of the total active Air Force strength.

#### *The Air Force Reserve*

The total strength of the Air Force Ready Reserve on June 30, 1957, was 45,699 officers and 172,147 airmen. This total of 217,846 reflects a loss of 100,112 from the December 31, 1956, total of 317,958 but is only 27,500 less than the assigned end goal for fiscal year 1958. This loss can be attributed to the effects of the screening process and the operation of the Reserve Officer Personnel Act of 1954. Conversely, the total strength of those in a drill pay status increased from 56,313 on December 31, 1956, to 61,677 on June 30, 1957, an increase of 5,364 officers and enlisted men. It is anticipated that the assigned 1958 end goal drill pay strength of 73,000 will be met. Under the provisions of Section 510, Title 10, United States Code, the age limit was extended to permit enlistments in the Air Force Reserve of personnel in the 18½ through 26 year age group. These enlistees assumed a 6-year obligation, with 6 months on active duty including basic and technical training and the following 5½ years actively participating in the Ready Reserve. Acquisitions in this category were accepted for specific Air Force Reserve vacancies and their number was limited, when combined with the 17 to 18½ year enlistees previously authorized, to the established ceilings of 2,500 for fiscal year 1957 and 3,600 for fiscal year 1958. The enthusiastic response to this program encouraged authorizing enlistments in the quotas for both years and by June 30, 1957, a total of 2,804 had been accepted. In addition, 466 critically skilled personnel were enlisted under the special provisions pertaining to them under Section 262, which permits them to work at their specialty after their basic training, until 6 months' active duty has been completed. They are not required to participate actively in reserve activities during the remaining 7½ years of their obligation if they continue to be employed in a critical defense supporting industry in their civilian capacity.

Training has progressed satisfactorily and the most significant indication of current combat capability was the continued radically sharp drop in major aircraft accidents during the period of this report. This was achieved despite the fact that the total number of flying hours accomplished by the Air Force Reserve was well above that of recent years and many units were in the process of conversion to newer type aircraft. Another step forward in improving overall efficiency in training was the adoption this year by the Air Force Reserve of the Air Reserve Technician Plan. This plan involves the replacement of permanent party personnel with civilian employees who will also be members of the Reserve unit for which they work and who will provide substantial savings in the manpower required to support the Flying Wing Program. During March 1957, the Air Force put another plan into operation called "Swift Lift." Under this plan Reserve crews flying Reserve aircraft will be available to perform active force airlift missions anywhere in the Zone of the Interior. This plan is expected to yield ultimately 54 in-commission aircraft per day for active Air Force airlift augmentation. Still another procedure now being implemented in the Air Force

Reserve to improve mobilization readiness is known as the Match-Merge Program. The object of this program is to include in the paid drill programs only those for whom a requirement exists on mobilization.

On June 30, 1957, there were 92,116 officers and 111,936 enlisted personnel in the Standby Reserve. As of the same date, there were 110,844 Reserve officers and 1,993 Reserve airmen serving with the active Air Force and they constituted 77 percent of the officer and less than one-half percent of the enlisted total active Air Force strengths.

## Facilities

During fiscal year 1957, it became apparent that additional funds would be required to continue the reserve facilities construction and improvement program as all monies authorized under the National Defense Facilities Act (NDFA) of 1950 had been expended or obligated. Legislation has been prepared which will augment the existing balance by \$80 million. Authority exists to utilize these funds through fiscal year 1958.

The Board feels that in allocating facilities funds, continued emphasis should be placed on the development or acquisition of weekend training facilities and ranges for small arms firing. As previously pointed out, such facilities would permit completion of more phases of individual training during weekly drill periods which in turn would make additional time available for unit training in the summer periods of active duty for training.

The present "freeze" on Army Reserve construction and lease funds has prevented procurement of suitable facilities for rapidly expanding units. Consequently, men in these units have frequently lost interest in programs improperly presented because of crowded conditions. The Board believes that the effect of these short-range economy measures should be avoided if possible by better long-range planning.

### *The Army National Guard and the Army Reserve*

As of June 30, 1957, a total of 1,747 state-controlled armories, provided without Federal assistance under Public Law 783, 81st Congress, were being used by the Army National Guard. Of this number, 916 are considered by the states as adequate for continued use. Under the authority of the same law, 979 armories have been constructed or programed with Federal contributions. The ARNGUS estimates a total of 885 additional armories must be provided to meet the overall requirement of 2,780 armories. During fiscal year 1957, 228 construction projects costing \$29 million were started and 207 projects requiring \$18.2 million were completed.

There were 1,959 United States Army Reserve centers as well as some facilities in leased, donated, constructed, or programed spaces at the end of fiscal year 1957. The Department of the Army considers that 449 of the 1,959 centers are adequate for long-range continued use. Based on current plans, when all authorized Army Reserve units are activated and manned, the Army Reserve will require a total of 2,570 centers. Thus the ultimate Army Reserve requirement is 2,121 additional centers. During the period between July 1, 1956, and July 1, 1957, 68 construction projects costing \$21.5 million were started and 48 projects requiring \$12 million were completed.

In summary, on June 30, 1957, there were 4,685 Army National Guard armories and Army Reserve centers in use or programed and of this number 2,344 are considered adequate for continued use. When all currently planned Army National Guard and Army Reserve units are activated and manned, the Army will require a total of 5,350 centers and armories.

The cost of Reserve facilities mentioned above and the requirements for additional authorizations in fiscal year 1958 and future years to complete the Army's Reserve Forces Construction Program totals \$789 million. Funds appropriated during fiscal years 1951 through 1957 totaled \$189 million of which \$119 million was allocated to the Army National Guard and \$70 million to the Army Reserve. Future required authorizations indicate a need of \$252 million for the Army National Guard and \$348 million for the Army Reserve.

#### *The Naval Reserve*

On June 30, 1957, the Naval Reserve had 319 training centers or facilities, 217 electronic facilities, and 28 major Naval Air Reserve training facilities. Only 2 new training centers are required to meet the ultimate goal of 321. Reduction in personnel and funds available have necessitated planning a cut in the number of major Naval Air Reserve training facilities from 28 to 26. Of the 319 training centers or facilities, 204 or 64 percent are jointly used with the Marine Corps Reserve, National Guard, Army Reserve, Air Force Reserve, or Coast Guard Reserve. Future requirements relate chiefly to rehabilitation or modernization of existing facilities and also to replacement of existing installations where necessary because of deterioration, lease terminations, and encroachments of nongovernmental activities.

During fiscal year 1957, a total of \$19.4 million was obligated for the combined air and surface Reserve construction program. Since 1951, \$104 million has been appropriated for Naval Reserve aviation facilities. Foreseeable needs for the air program are estimated at \$186 million primarily to replace, expand, or improve existing facilities which are inadequate for modern aircraft. Future requirements for the surface program are estimated to be approximately \$32 million.

#### *The Marine Corps Reserve*

During fiscal year 1957, the Marine Corps Reserve expended \$1.4 million in their facilities construction program. The program for fiscal year 1958 involves eight projects at a total estimated cost of \$1.4 million. A long-range construction program has been established for accomplishment subsequent to fiscal year 1958 which includes 33 projects totaling \$7.2 million. Approximately 38 percent of the major construction contemplated for fiscal year 1958 is to be accomplished jointly with the Naval Reserve.

#### *The Air National Guard and the Air Force Reserve*

The Air National Guard Program provides for 27 wings and 87 tactical squadrons. On June 30, 1957, the Air National Guard occupied 91 flying bases and 41 nonflying bases as compared with the requirement for a total of 94 flying bases and 42 nonflying bases. During the fiscal year 1957, the Air Guard utilized \$42.3 million of the funds allocated for this period for construction of facilities and the development of plans on projects scheduled in future years.

The Air Force Reserve Program provides for a total of 24 wings consisting of 72 tactical flying squadrons located at 45 airfields. As of June 30, 1957, tactical operations were being conducted at 39 airfields. Complete facilities have been built at some of these locations but a continuing extensive construction program is necessary to provide the required facilities at these flight centers. On June 30, 1957, there were 93 nonflying centers in existence but only 5 of these centers have been constructed or are in the process of being constructed. The balance of 88 centers are located in Government-owned or -leased facilities. A total of \$33.1 million of construction funds has been utilized for the building of flying unit facilities by the Air Force Reserve during fiscal year 1957.

## Equipment

### *The Army National Guard and the Army Reserve*

The equipment situation within the Army National Guard has shown improvement over the last 6 months. Shipment of M-47 tanks and certain types of artillery materiel has reduced previous shortages and the use of substitute items. The Army National Guard is better equipped now than at any time in its history. The states' abilities to properly maintain equipment depends upon the Federal Government providing necessary funds to operate state-owned National Guard equipment and storage and maintenance facilities. Consequently any substantial additional issues of equipment to the National Guard should be accompanied by a compensating increase in funds for storage facilities and maintenance personnel.

The quantity of equipment issued to United States Army Reserve units has increased during the period covered by this report. Lack of adequate numbers of full-time maintenance personnel at the unit level has been a limiting factor in the issue of equipment to Army Reserve units. Currently Army Reserve units have approximately 4 percent of authorized TOE allowances on an average basis. The objective for fiscal year 1958 is to increase the quantity of TOE equipment issued to 10 percent. Most of the equipment issued to Army reserves is standard, limited standard, or serviceable substitute type items and is adequate, along with equipment available in Army Reserve equipment pools, for training purposes. Obsolete items are being replaced as rapidly as replacements are available.

### *The Naval Reserve*

Sustantial progress has been made in converting to modern aircraft suitable for mobilization use in the Naval Air Reserve. All fighter and high-speed attack squadrons are now equipped with jet aircraft and fewer than 5 percent of the operational aircraft are World War II models. Special emphasis has been placed on providing first-line aircraft of the current fleet P2V and S2F types for the antisubmarine squadrons. Shortages exist in the antisubmarine helicopter and in the transport plane categories. Within a year it is anticipated that the helicopter deficiency can be corrected numberwise, but there will remain a need for the types required in effective antisubmarine training. Less progress has been made in improving airfields and facilities which are predominantly of World War II construction. Some must be modernized or relocated if efficiency and latitude of training are not to remain restricted.

Destroyer escort type ships in good material condition are expected to be released from the Fleet during fiscal year 1958 for use as Reserve training ships to replace older ships now assigned to the Surface Reserve Program. These especially selected vessels equipped with modern electronics and ordnance installations should provide the needed facilities for effective training of the recently created Fleet Division units.

### *The Marine Corps Reserve*

As of June 30, 1957, it is estimated that all activated Marine Corps Reserve drill pay ground units had on hand approximately 80 percent of their overall equipment allowances, 75 percent of which is adjudged modernized. Constant changes to modernized equipment are being made to keep this equipment current with mobilization requirements. There are no major shortages of equipment that impair the training of ground unit personnel. When facilities are available and the level of training warrants, full allowances are supplied.

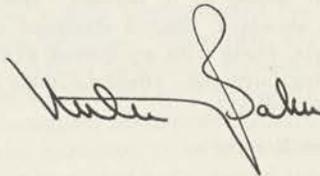
The overall state of equipping Marine Corps Drill Pay Reserve aviation units is estimated to be 90 percent for the VMF (Fighter) squadrons and 85 percent

for the Marine Air Control Squadrons. These squadrons have 80 percent and 90 percent, respectively, of on-hand equipment modernized. The state of equipping these squadrons will continue to improve with the delivery of more modern equipment as it becomes available.

*The Air National Guard and the Air Force Reserve*

On June 30, 1957, the Air National Guard had 1,360 jet fighters, 212 single engine jet trainers, and 111 single place jet reconnaissance aircraft out of a total of 2,027 aircraft. During the past year, there was only one new tactical aircraft type received in the Air National Guard inventory. It is estimated that the Air National Guard units were equipped with 90 percent of their required items. Receipt of heavy mobile search radars together with tactical air director radars considerably improved the operational and training capabilities of all Air Control and Warning Units.

At the termination of fiscal year 1957, the Air Force Reserve possessed a total of 801 aircraft—249 jets and 552 conventional types. Since December 31, 1956, the number of jets had decreased and the number of conventional types has increased partly as a result of the emphasis now being placed on air transport as a mobilization mission of the Air Force Reserve.



MILTON G. BAKER,  
*Chairman, Reserve Forces Policy Board*

*Semiannual Report*  
*of the*  
**SECRETARY OF THE ARMY**

**January 1, 1957, to June 30, 1957**

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## ***1. Introduction***

Fiscal year 1957 has been another period of splendid achievement in the Army.

During 1956 we announced the Pentomic concept, which defines the vast changes effected in warfare by missiles and nuclear explosives and which prescribes the flexible organizational structure, the weapon requirements, and the high-caliber manpower necessary for Pentomic proficiency.

This year, from an organizational standpoint, the Pentomic Army no longer is just a concept. To a great extent it is a reality. The Army virtually completed the reorganization of about half of its combat forces in less than a year. (See fig. 1.) Remaining units will be reorganized in the next 12 months. That these vast changes were—and are being—effected without seriously unbalancing the Army's combat posture is a clear example of the swift and skillful aptitude which today is the character of our Army and the keynote of its operations.

In any changeover of this magnitude there are inherent problems. Some of these problems are within the Army, in the task of continually refining and polishing the new combat plan and in developing the entirely new weapons and equipment necessary for the plan's most effective execution. The Army recognizes these internal problems and is energetically applying itself toward arriving at the most feasible solutions.

Other problems are beyond the Army's province. The main one is the constantly increasing price of preparedness when the Army must pay more each year for all its goods and services. Preparedness is necessarily costly, but not excessively so, when considered in the light of the end product and the goals to be achieved.

The Army, in every phase of its operations, is diligently seeking resolution of this problem. From the highest echelon down to the individual soldier, in every command and installation in the United States and abroad, every possible measure is being pressed to effect maximum economy. In the field of management the Army has made significant progress. Through the continued implementation of sound management practices, the best combat army possible has been achieved within available resources.

It is obvious, however, that there is a point at which dollar economy can become false economy when the size and capabilities of the Army are measured against the threat of war with armies of much greater



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*Figure 1. Retiring the guidons of units at Fort Myer.*

numerical superiority and apparently great capability. To underestimate the enemy or our own requirements could be disastrous.

The ultimate resolution of the problem, the task of equating costs with a sound level of defensive strength, is a responsibility of our civilian and military leaders and the American people. The answer lies in properly assessing the Army's mission and needs in a balanced evaluation of the Nation's overall defense requirements. This in turn requires a clear and thorough understanding of the Army's role, accomplishments, and difficulties. It is hoped that the review presented on the following pages will assist to that end.

## II. Operations

The high level of the Army's combat readiness around the world was a principal deterrent to war during the past year. Nineteen divisions and other fighting units were on duty at foreign stations and in the United States, giving substance to national war-prevention policies and courage and aid to free nations threatened by communist aggression.

In carrying out this overall mission during the year, the Army:

- reinforced its combat divisions in Europe and the Far East and the CORPORAL-armed Southern European Task Force in northern Italy with new weapons and equipment;
- streamlined the organization of combat divisions in both the United States and overseas under the Pentomic Army concept;
- increased the training of foreign military personnel;
- established the Strategic Army Corps of several crack divisions in the United States for quick dispatch to any possible trouble areas around the world;
- materially strengthened air defenses with new weapons, deployments, and increased training;
- activated two new powerful Missile Commands;
- strengthened and expanded Army aviation; and
- mapped nearly 1,400,000 more square miles of strategic areas around the earth.

### Foreign Operations

All foreign operations of the Army were sharpened to an even keener state of readiness during the past year. In the equipping, composition, and deployment of 10 divisions and other combat units, and in programs of technical and materiel aid to foreign nations, the Army reinforced its capability of meeting any type of warfare around the earth. The work of its officers and men in 73 foreign countries again made the Army the most widely deployed military force in the world.

Fighting units were arrayed as follows:

In Europe, facing Red forces across the German frontier, were 2 armored divisions, 1 airborne division and 2 infantry divisions. In the northeastern plain of Italy between the Alps and the Adriatic Sea was the Southern European Task Force (SETAF).

Two divisions were in South Korea.

One division was in Japan.

In Hawaii was one division; and another, at reduced strength, was based in Alaska. An infantry regiment and supporting anti-aircraft units were in the Caribbean area.

All units were primed for action on a moment's notice.

The firepower of the European units was increased with CORPORAL guided missile battalions, capable of hurling atomic or non-atomic explosives (fig. 2), and plans were laid to convert the HONEST JOHN rocket batteries into battalions with additional launchers. Plans also called for an additional HONEST JOHN battalion to SETAF.

In addition, the efficiency and mobility of Army units around the world was increased appreciably with the shipment of 140 additional Army aircraft. These included 35 fixed-wing and 105 rotary-wing craft for observation, cargo, command, and liaison uses.

To streamline and tighten the Army division structure for both atomic and/or non-atomic warfare, one division in Europe was being reorganized under the Pentomic concept and firm plans were made for reorganizing the remainder of overseas divisions.

In connection with the Pentomic reorganization and the organization of other new units, the Army had laid plans to reduce the number of its combat divisions to 17 during fiscal year 1958 to derive greater fighting efficiency from units available with the money, men, and materiel planned for fiscal year 1958. Immediately after the end of fiscal year 1957, however, a reduction of 50,000 in Army military manpower was ordered, and at the time this report was being written the full implications of the new reduction had not been determined.

#### *SETAF*

The Southern European Task Force, located in northern Italy, is one of the newer units of the Army's atomic war concept. In a sense it is a forerunner of the new Army Missile Commands—units formed around the Army's powerful missiles and rockets. With only approximately 6,000 men, SETAF requires a minimum of surface or air transportation and yet packs an atomic or non-atomic punch of tremendous power. Two important aspects of its operation are its swift mobility—permitting it to fire and move quickly and fire again—and the accuracy of its CORPORAL or HONEST JOHN weapons, affording a high level of discrimination in case of war in the choice of targets in relation to nearby populations or objectives.

Aside from its combat-readiness, the unit has drawn praise from the press for its friendly and cooperative relationships with the local Italian population, a matter of no small importance in the efficiency of Army operations and the harmony of American foreign relations as a whole.



*Figure 2. CORPORAL guided missile taking off.*

### *Air Defense Units*

Firm plans were made for the overseas deployment soon of NIKE-AJAX and NIKE-HERCULES. In the past, the Army's foreign air defense positions have been armed with the SKYSWEEPER and 90-mm. and 120-mm. guns. In the near future they will be replaced with the guided missiles of AJAX and HERCULES, the latter of which has an atomic capability.

### *Military Training for Foreign Nations*

Under its own Foreign Military Training Program, and under the Military Assistance Program, the Army continued to make a major contribution to the deterrence of war through the training of foreign troops. More than 6,000 Army officers and men are engaged in this work, with benefits to the equivalent of 200 divisions in the allied free world.

In Army schools and installations in the United States during the past year, 4,429 foreign nationals—an increase of nearly 1,000 over last year—were trained in the latest warfare techniques and in the use of new weapons and equipment. Another 1,763 were trained in Army schools overseas. The effect of this work is multiplied as these foreign officers return to train men and units in their respective countries.

### *Military Assistance Program*

Under the Military Assistance Program during the past fiscal year the Army delivered approximately \$751 million in military equipment and supplies to 34 friendly foreign nations, with a greater proportion of the total going to the Near East (fig. 3) and Far East. This brought to \$9.4 billion deliveries made under the program since 1950. Deliveries during the past year included artillery, small arms, electronic equipment, and tanks and vehicles.

Under the Offshore Procurement Program, a portion of MAP materiel is manufactured in friendly foreign countries. Aside from the primary purpose of developing a military production capability overseas significant economic benefits to foreign areas result from this program. During the past year a total of \$65 million was placed in overseas contracts.

## **Continental U. S. Operations**

To deepen the strength of its overseas units and to provide the United States with a powerful striking force for emergencies, the Army established the Strategic Army Corps during the year.

The Corps is made up of divisions specially geared to go into action immediately if an emergency should arise either in the Western Hemisphere or anywhere in the world. Though security precludes a full discussion, the Corps plan provides that its units get up-to-the-minute

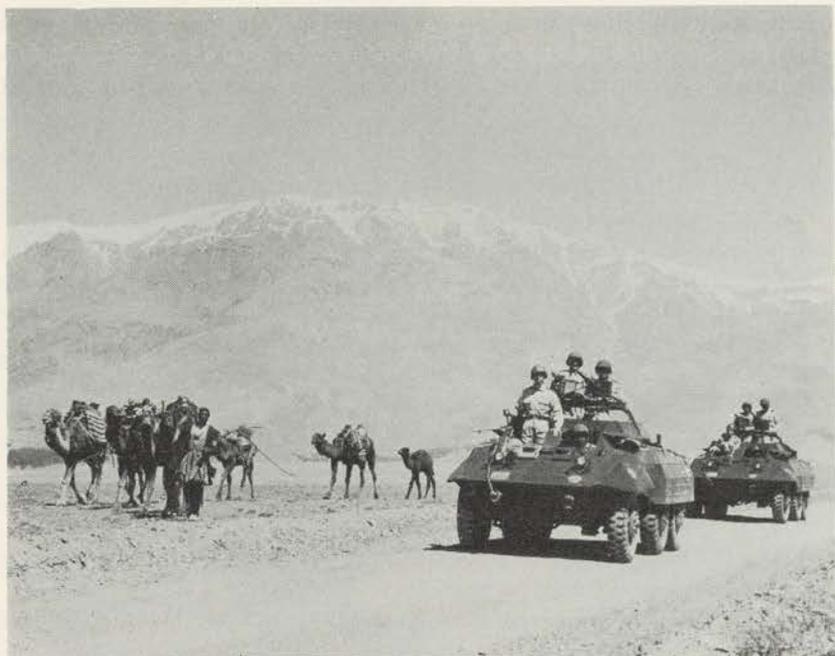


Figure 3. United States equipment in Iran.

equipment and training so they can move out with virtually no additional preparation in the event of war. To a great extent they are self-contained and self-sufficient, carrying with them most of the supplies they would need in the initial action. They stay on the alert on a round-the-clock basis.

The Corps is part of those divisions regularly maintained in the United States, called the Strategic Army Force, under the U. S. Continental Army Command (CONARC). During the past year the organization of CONARC was strengthened and streamlined with changes which pulled together the controls of the CONUS armies into one command under the supervision of, but separate from, the Department of Army in Washington, D. C. Headquarters of CONARC is at Ft. Monroe, Va. The command, under that name, was first established in February 1955, when the commanding general was given the responsibility for the development and testing of combat doctrine and equipment, the supervision of many Army schools, training, and the execution of United States defense plans. In April 1957, CONARC's responsibilities and authorities were extended in administrative matters previously controlled by the Department of Army.

#### *Air Defense*

Under the Army's air defense responsibilities, which required 46,208 active Army personnel in addition to National Guard units and ap-

proximately \$1 billion in Army funds during the year, the Nation's guard against air attack was sharply expanded. The number of localities under NIKE protection was increased to 24 by the end of fiscal year 1957, including cities, Strategic Air Command bases, and Atomic Energy Commission installations. In the training, organization, and activation of NIKE battalions—of approximately 500 men each—there was an increase over the previous year of 25 percent; and of the new battalions, at the end of fiscal year 1957, all were assigned and on site. The training of NIKE specialists—in courses up to 42 weeks in length—more than doubled during the year at the Air Defense Center at Fort Bliss, Tex., and there were sharp increases in the production, purchase, and delivery of NIKE equipment.

The number of antiaircraft gun positions was reduced significantly during the year with plan for their complete replacement by missiles in a relatively short time.

#### *New Air Defense Weapons and Equipment*

A number of critically important developments in air defense weapons were achieved during the year.

The first is NIKE-HERCULES (fig. 4), another member of the NIKE family and successor to the NIKE-AJAX. HERCULES received its final tests during the past year and contracts were let for its production. The new missile will have several times the range of AJAX, a greater altitude capability, even greater accuracy than AJAX, and it will be able to carry a nuclear warhead—making it the most powerful antiaircraft weapon in the world today. It is planned that HERCULES will use the same sites and personnel now employed for AJAX.

Another important advancement was HAWK, to supplement the NIKE missiles against low-flying aircraft. The NIKE missiles are designed particularly to counter high, fast aircraft and they can bring down any such plane in the world. HAWK has been tailored especially for aircraft flying at low altitudes. It can operate in the United States in conjunction with other antiaircraft weapons and is easily transportable over land or by aircraft and therefore can be used by troops in the field.

Another air defense weapon now in the development state (see ch. III) is the anti-missile missile NIKE-ZEUS, a weapon of tremendous speed to intercept and destroy attacking enemy missiles, including the intercontinental ballistic missile, required for North American defense in the missile era. Substantial progress was made in the development of ZEUS during the past year, indicating its addition to America's air defense system in the foreseeable future.

Progress in the perfection of the MISSILE MASTER was such during the past year that the system soon will be placed in operation

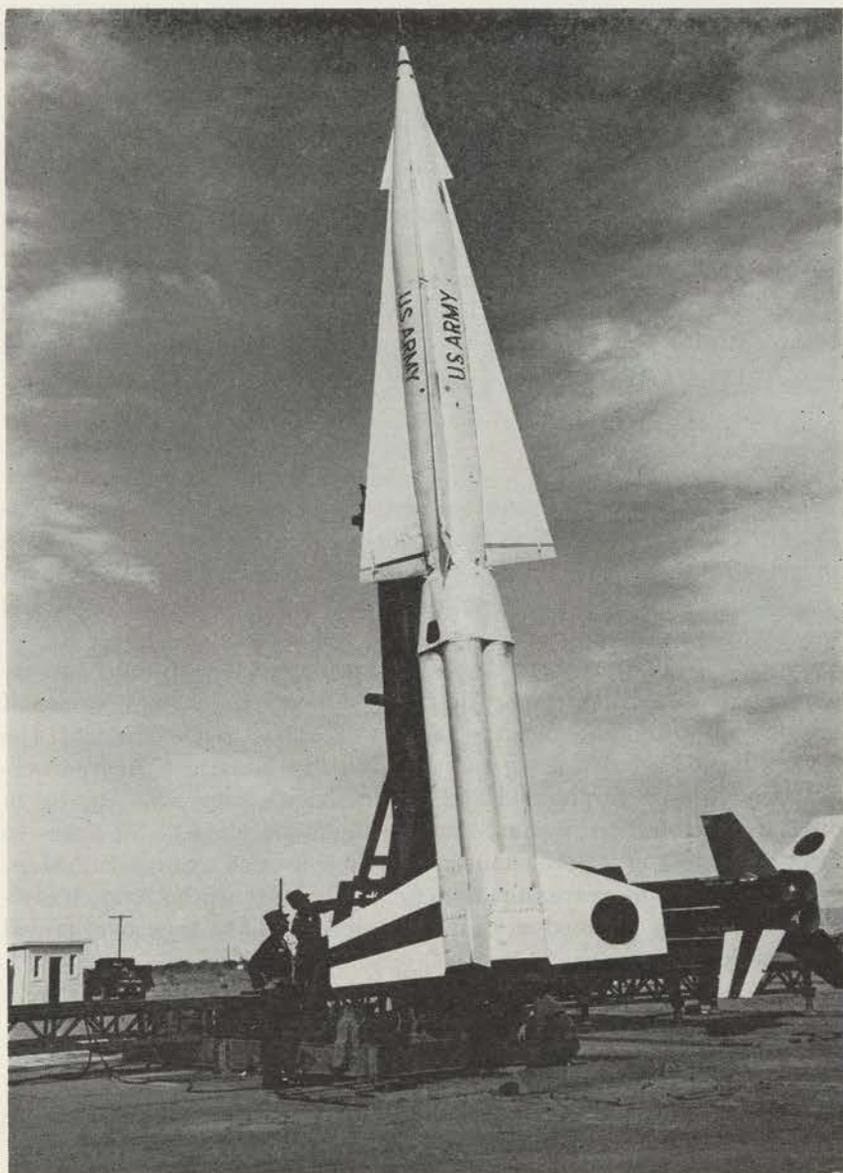


Figure 4. NIKE-HERCULES on launcher.

in the Washington-Baltimore area. The system makes use of advanced electronic data processing and transmitting techniques to detect, track, and fire upon enemy aircraft and to coordinate the fire of batteries in different areas.

#### *National Guard Air Defense Units*

By the end of the past year 105 antiaircraft gun battery positions were manned by National Guard units. In the gradual retirement of these positions, the Army hopes to use the Guard units in manning certain NIKE positions across the Nation, giving the National Guard valuable training and freeing active Army personnel for other duties. To develop procedures for the conversion, a Guard battalion will begin training this year to take over several NIKE positions around Los Angeles, Calif.

### **New Combat Units**

#### *Pentomic Reorganization*

The Army's Pentomic reorganization—effecting the most revolutionary changes in warfare tactics in modern history—was given a priority effort by all Army agencies during the past year. Seven combat divisions had completed reorganization by June 30, 1957, and the changeover of an eighth was nearly finished.

Despite the vast amount of work required in the shifting and reshaping of units, the preparation of new doctrine and new tables of organization, and the issuance of new weapons and equipment, the revamping of six divisions was achieved in 6 months. Reorganization schedules were planned and executed with very close timing in order to maintain in combat-readiness enough units at all times to meet any emergency. In connection with this same requirement, staggered schedules of reorganization for the balance of the Army's divisions have been planned so that all units will have been overhauled by June 30, 1958.

Included in the divisions reorganized during the past year were 2 airborne, 2 armored, and 3 infantry divisions.

#### *Pentomic Division Structure*

The new Army division is fashioned around the concept of future warfare when the range and power of missiles will make the age-old lineal array of opposing armies impracticable and suicidal. Instead, deployments probably will be of a checkerboard design, with units of each opposing army widely separated while they plunge deep into the territory of the other. Units must be capable of concentrating quickly for an attack and then rapidly dispersing again. Army units therefore will be flexible enough for any type of combat requirement; they will be semi-independent and more self-sufficient than

ever before; and they will have unprecedented firepower, communications that afford the commander instantaneous control over his widely arrayed forces, and a mobility on the ground and in the air that permits units to make swift movements over vast distances.

A final, critical requirement is target acquisition. Missiles and nuclear explosives have given armies a destructive power of such speed and magnitude that the ability to detect and fire upon the enemy before being detected and fired upon may be the difference between survival and annihilation. The Army, then, must seek to avoid detection and it must have the means for locating enemy units with swiftness and accuracy.

These overall requirements of the Pentomic Army span the board of Army activities, from the supply of small arms to military medicine. All Army agencies are revising concepts and procedures.

The focal point of the work, however, is the combat division, the end result of planning, research, training, reorganization, and supply.

As revealed in the semiannual report of June 30, 1956, the Pentomic plan provides for a division of five main units, called battle groups, with most subordinate infantry and artillery units also broken down into five elements. Each battle group is administratively self-contained and designed to function with considerable independence.

The airborne division has 11,486 men, as compared to 17,085 formerly. Its weapons and equipment, all air-transportable, include:

HONEST JOHN, with an atomic capability

105-mm. howitzers

105-mm. and 81-mm. mortars

Light weapon carriers

90-mm. self-propelled gun

106-mm. recoilless rifles

Target acquisition equipment, including television, infrared equipment, and cameras

Fixed-wing aircraft

Helicopters

The infantry division, which has 13,748 men as compared to 17,455 formerly, also is designed to be as air-transportable as possible, with less and lighter equipment and fewer, but more powerful, weapons. Its weapons and equipment include:

HONEST JOHN, with an atomic capability

105-mm. howitzers

105-mm. and 81-mm. mortars

90-mm. self-propelled gun

106-mm. recoilless rifles

8-inch howitzers

155-mm. howitzers

- Tanks with 76-mm. guns
- Tanks with 90-mm. guns
- Armored personnel carriers
- Target acquisition equipment, including television, infrared equipment, and cameras
- Fixed-wing aircraft
- Helicopters

In both the airborne and infantry divisions, some of the equipment is for interim use, pending the availability of new weapons. The Pentomic reorganization deliberately has been planned with an elasticity and flexibility to permit the easy integration of new weapons for an indefinite period.

The combat division firepower probably will be augmented in the near future with weapons such as the DART, LACROSSE, and SERGEANT guided missiles, the LITTLE JOHN artillery rocket, NIKE, HAWK, and flamethrowers.

The new M-14 rifle, full or semi-automatic, the automatic M-15 rifle, and the M-60 machine gun already have been adopted. All fire the 7.62-mm. NATO cartridge.

The armored division, because of its mobility and heavy firepower, required relatively little revision under the Pentomic plan. Changes include the addition of an atomic capability and more non-nuclear firepower. Weapons and equipment include:

- HONEST JOHN, with an atomic capability
- Tanks with 76-mm. guns
- Tanks with 90-mm. guns
- 8-inch howitzers
- 155-mm. howitzers
- 105-mm. howitzers
- 81-mm. mortars
- Armored personnel carriers
- Target acquisition equipment, including television, infrared equipment, and cameras
- Fixed-wing aircraft
- Helicopters

#### *Missile Organizations*

The organization of missile units was speeded and expanded during the year, further developing the Army's hitting power, mobility, and tensile strength, and illustrating the extent to which the Army is integrating missiles and adapting much of its structure and tactical doctrine toward exploiting the great force, range, and versatility of these weapons.

The principal missile units developed during the past year were the Missile Group and the Missile Commands. As in all the Army's

# MISSILE COMMAND - MEDIUM

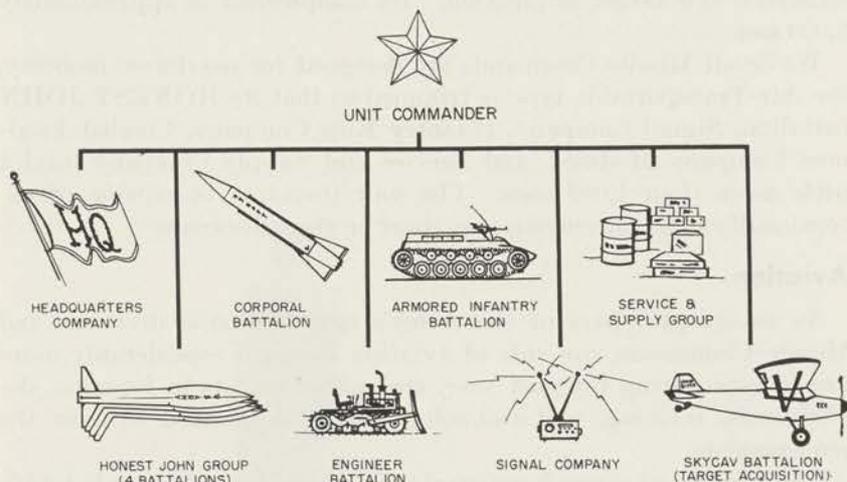


Figure 5.

new units, great flexibility and elasticity have been written into their design so that to some extent they are interchangeable.

The first Missile Group, to be activated in September 1957 at the Redstone Arsenal in Huntsville, Ala., is made up of the 217th Field Artillery REDSTONE Battalion, an Ordnance Company, and an Engineer Company to provide liquid oxygen. It totals approximately 800 men.

The missile group, as such, is designed to operate with a field army. With the REDSTONE missile as its principal weapon—the largest and most powerful and most accurate surface-to-surface missile soon to be operational in the United States—the group will afford the field army an atomic striking power over a range of at least 200 miles.

By adding a Signal Company, a Reconnaissance Company, and an augmented Engineer Company, the Missile Group becomes a Heavy Missile Command, a self-contained unit capable of independent operations, with a complement of approximately 1,400 men.

The first of two other types of Missile Commands was activated on March 1, 1957, a Medium Missile Command at Fort Hood, Tex., and an Air-Transportable Missile Command at Fort Bragg, N. C.

The Medium Command, of which SETAF is a prototype, is the largest of the three types in terms of numbers of men and amounts of equipment. (Fig. 5.) (The terms Heavy and Medium apply to weapon sizes.) Its composition includes a CORPORAL Battalion,

a combat Engineer Battalion, a Signal Company, a Service and Supply Group, and a Sky Cavalry Battalion consisting of aviation and mobile ground units equipped with electronic devices for reconnaissance and target acquisition. Its complement is approximately 5,000 men.

While all Missile Commands are designed for maximum mobility, the Air-Transportable type is trimmed so that its HONEST JOHN battalion, Signal Company, Infantry Rifle Company, Combat Engineer Company Modified, and Service and Supply Company total a little more than 1,000 men. The unit therefore is capable of exceptionally swift movement, over short or great distances.

### **Aviation**

As an integral part of the Army's new Pentomic divisions and Missile Commands, the role of aviation assumed considerably more importance during the past year, and advancements in function, deployments, training, and technology were emphasized to meet the requirements.

The number of aircraft assigned, or planned for, each combat division was nearly doubled, providing increased efficiency, under the Pentomic reorganization, in fire adjustment, in the transportation of supplies (fig. 6) and occasionally personnel, and in reconnaissance and target acquisition. As part of the continuing, evolutionary changes in the Army's structure and operation, the exploitation of aviation—in types, sizes, and uses of aircraft—will be a factor of increasing importance.

At the end of fiscal year 1957, the Army, including the National Guard, had 2,587 fixed-wing airplanes and 1,951 helicopters, for a total of 4,538 aircraft, and 5,050 pilots. The number of aircraft had increased approximately 27 percent during fiscal years 1956 and 1957 and the number of pilots approximately 55 percent.

#### *Organization and Deployments*

To increase the value of aircraft in combat operations, aviation units within the infantry, airborne, and armored divisions were consolidated into companies. Formerly the aircraft were assigned to different subordinate division elements, such as field artillery or signal. The new doctrine centralizes and reduces administrative and maintenance requirements, and yet affords subordinate commanders operational control over aircraft supporting their assignments.

Four new helicopter companies were activated during the year and 3 were deployed. One additional fixed-wing company was activated and 2 others were deployed overseas. Plans for fiscal year 1958 call for the activation of 3 more helicopter companies and an additional fixed-wing company.



Figure 6. Helicopters being used for cargo transportation.

During the year a total of 21 fixed-wing aircraft and 29 rotary-wing planes were shipped to Europe, 4 FW's and 46 RW's to the Far East, 5 FW's to the Pacific, 2 FW's and 11 RW's to Alaska, and 3 FW's and 19 RW's to the Caribbean.

In the interest of saving funds and time, the Army in May 1957 began testing the feasibility of ferrying its aircraft to foreign assignments, as opposed to shipping them via surface transport. Two L-23D's were flown from Delaware to Germany. The L-23D is a twin-engined craft with a normal range of 800 miles. Though the trans-Atlantic flight required 4 days with four intermediate stops, this was considerably less time than that usually required for surface shipment, with appreciable savings also in shipping costs.

#### *Aviation Training*

To achieve greater efficiency in the Army's management of its air operations, the responsibility for training Army aviators was transferred from the Air Force to the Army on July 1, 1956. In the same action, Gary and Wolters Air Force Bases, both in Texas, were transferred to the Army and renamed Camp Gary and Camp Wolters.

During the year, primary training for fixed-wing aircraft was initiated at Gary and primary rotary-wing training was begun at Wolters. In both instances, instruction was being provided by contracts, which have been found to provide savings in military personnel and dollars.

After completing primary training, Army aviators go to the Army Aviation School at Fort Rucker, Ala., where fixed-wing pilots get advanced tactical training as part of a combat unit, and helicopter pilots receive advanced instruction in the handling of larger types of rotary-wing aircraft. To achieve greater versatility in all phases of Army aviation, a considerable number of fixed-wing pilots are being trained also as rotary-wing aviators.

During fiscal year 1957, a total of 1,043 men were trained as fixed-wing pilots, 623 as rotary-wing pilots, and 239 received cargo helicopter instruction. In addition, several hundred National Guard pilots were trained.

Instrument flying was emphasized during the year with the establishment of schools in all but one Army area. This instruction was being handled again via contracts.

An important achievement was the initiation of primary aviation training for college senior ROTC students, under Public Law 879. Students enter the program on an extracurricula basis, with instruction provided by civilian flying schools. They receive 35 hours of ground instruction and 36½ hours of flight training, and are qualified then for private flying licenses from the Civil Aeronautics

Administration. There is no cost to the trainees, who agree to serve on active Army duty as commissioned officers for 3 years upon completion of the course. A total of 48 educational institutions were authorized to conduct the training, and by the end of the fiscal year 173 students had completed the course. During fiscal year 1958 nearly 700 trainees are expected to enter the program.

#### *Technical Achievements*

Under programs aimed at advancing the use of rotary-wing aircraft, Army pilots set several records during the year.

Flying Army Sikorsky H-34's, they set new world speed records for closed circuits of 100, 500, and 1,000 kilometers, with average speeds of 141.9 m. p. h., 136 m. p. h., and 132.6 m. p. h. respectively. A new world helicopter record for "distance in a closed circuit without pay load" was set when Army aviators flew the Vertol H-21C for 1199.07 miles non-stop in 11 hours and 58 minutes.

For the first time a helicopter, an Army Vertol H-21, was flown non-stop from the west coast to Washington, D. C., when the Army tested the feasibility of ferrying aircraft over great distances. The flight, made possible by utilizing new en route aerial refueling techniques developed by the Army, took 32 hours to complete. For the first time in aviation history, in-flight transfer of fuel from a fixed- to rotary-wing aircraft was accomplished. An unofficial world record for helicopter distance and endurance was established.

A global flight information service was established by Army aviation during the year. In the past, Army pilots used the information facilities of other Government agencies. These were not adequate for the Army's needs, however, since they did not have data concerning Army, National Guard, and some civil airfields suitable for Army air operations. The new service will include navigation aids, radio facilities, airway routing, radio procedures, radar information, danger area data, and instrument let-down and approach procedures. Field detachments were planned for Germany, Japan, the Canal Zone, and Alaska.

#### **Mapping**

Critical to effective military operations in peace or war are detailed and accurate maps in a variety of scales and forms. In the fluid actions of future warfare over vast areas, and in the Army's requirement of fighting successfully in any geographical area over any type of terrain, mapping is given an even more important mission. During the past year the Army Map Service, the largest organization of its type in the world, expedited its efforts in all departments to meet the requirements.

### *New Areas Mapped*

The Army's continuing program of mapping strategic areas around the earth covered 309,100 square miles of large-scale, and 1,060,700 square miles of medium-scale, mapping during the past year. Much of the work was accomplished by Army aerial photography.

The Inter-American Geodetic Survey entered its seventh year of successful operations in Central and South America. The Survey is a joint mapping effort of the Army and 17 pan-American nations, functioning on a year-round basis. Each country supports the program by providing personnel, equipment, and money, and is assigned an Army team to train the local unit in actual mapping operations. The local country thus acquires mapping personnel trained in the most modern methods and the Army acquires Central and South American mapping data valuable for defense purposes.

Cooperative agreements were signed with Argentina, Denmark, Germany, Laos, and Vietnam during the fiscal year.

### *Production and Techniques*

In addition to the tens of thousands of map copies turned out every year for use by military units throughout the world, the Map Service in the past year issued 93 new small-scale map sheets and published 155 new plastic relief maps which give the viewer a perspective of the relative heights and depths of the terrain.

An important achievement, under research for several years, was the first-stage development of a plastic sheet material to permit the folding of relief maps, which heretofore have been difficult to handle and ship for reason of their inflexibility. An order for the first test run of the new maps already has been placed.

Another advancement under development is an instrument which reduces times and costs in the preparation of relief maps. Using either aerial photographs or an existing map as a guide, the equipment cuts the necessary profiles directly without requiring the previous step of a deep etch plate. Hand-finishing work thus will be reduced.

### *International Geophysical Year*

As part of the Army's role in Project VANGUARD, the Army Map Service is responsible for supporting and operating six observation stations to track the earth satellites at Santiago, Chile; Antofagasta, Chile; Lima, Peru; Quito, Ecuador; Havana, Cuba; and Fort Stewart, Georgia. Another element is located on certain Pacific islands, and it is hoped that the orbit of the satellite can be used for more accurately establishing the geodetic location of the islands and for more accurately determining the exact figure of the earth. Eighty-five Army personnel are engaged in the project.

### III. Research and Development

The Army accelerated its research and development program to an unprecedented level of activity during the past year, racing to meet the ever-expanding demand for new war material and weaponry to safeguard the free world.

Efforts by the Army to maintain a world lead in more effective and efficient equipment are given a critical importance in recognition (a) that the Army can be called upon to fight any type of conflict from the Korean-type to all-out nuclear war; (b) that the enemy probably will have a distinct numerical superiority in manpower; and (c) that the time of any possible conflict will be at the choosing of the enemy.

These overriding considerations have spurred the Army's research and development team of military and civilian scientists in every area of activity from assault boats to Arctic construction, and from packaging to aircraft. The greatest emphasis, however, remains directed at missiles and atomic weapons which the Army pioneered beginning in World War II. (See fig. 7.)

Within the limitations of careful security considerations, this chapter reports on some of the year's principal accomplishments:

- JUPITER moved ahead of schedule;
- work was expedited on the new supersonic guided missile SERGEANT;
- three other new guided missiles—LACROSSE, HAWK, and NIKE-HERCULES—reached the production stage;
- the anti-missile missile NIKE-ZEUS program progressed substantially;
- two new rifles and a new machine gun were adopted, replacing a total of 7 other weapons;
- tests of entirely new aircraft concepts were launched, and the Army completed development of the new T53 turboprop engine;
- the keel for a new 338-foot beach lighter was laid;
- new penetration capabilities were achieved with combat surveillance radar;
- ice rooms were constructed successfully under the Arctic ice-cap and other Army Arctic techniques helped to prevent a major emergency in the Navy's Antarctica operations;
- the Army package power reactor was completed and dedicated at Ft. Belvoir, Va.;
- the development of small-yield atomic warheads was advanced; and

# ARMY

## RESEARCH & DEVELOPMENT

### FY 1958 FUNDING PROGRAM

	Million Dollars	Percent
 GUIDED MISSILES	93.0	25.1
 MILITARY SCIENCES	67.7	18.2
 OPN & MAINT OF FACILITIES	67.0	18.0
 OTHER EQUIPMENT	64.1	17.3
 AMMUNITION	31.8	8.6
 VEHICLES	16.7	4.5
 ARTILLERY	16.0	4.3
 AIRCRAFT	14.8	4.0
 SHIPS & SMALL CRAFT	.1	0.0
TOTAL FY 58	371.2	100.0
TOTAL FY 57	389.8	100.0

Figure 7.

—initial steps toward the construction of the Army Ionizing Radiation Center were taken.

### **Firepower**

A major key to success in any future war will be firepower, measured and controllable for any type of tactical or strategic situation, for any type of climatic or terrain requirement, and for either nuclear or non-nuclear conflict. This has deepened the Army's need for a variety of accurate missiles, with spectacular achievements during the past year. At the same time, progress and decisions of equal note were made with regard to the hand guns of the individual soldier who, by necessity, shoulders the heaviest responsibility in any war.

#### *Surface-to-Surface Missiles*

JUPITER, when its program was begun, was little more than a name of the requirement for a ballistic missile which would deliver a nuclear blast, accurately, at ranges of approximately 1,500 nautical miles or 1,727 statute miles. As the result of remarkable work by Army Research and Development during the past year, JUPITER has become a distinct reality, with the success of its test firings indicating that it can be operational in America's missile arsenal ahead of schedule.

These tests also indicate that the weapon will meet its operational requirements. This success of JUPITER has been due to the efficiency of the Army and private industry scientists and engineers in applying established Army missile know-how and in evolving entirely new concepts and techniques necessary for JUPITER's specific requirements. Principles established in part as a result of the Army's 10 years of work on the first NIKE have been applied to the JUPITER, as well as knowledge gained from the Army's development of the supersonic CORPORAL, the free world's first operational surface-to-surface ballistic guided missile. This long, broad experience has contributed heavily to the framework of all missile engineering principles in the United States. Considerable time and money have been saved in using REDSTONE—the Army's 200-mile missile—as a means for testing certain JUPITER components, such as its guidance mechanisms. Similarly, the JUPITER-C has provided the means for testing other JUPITER requirements peculiar to long-range flights. An example is the material and design necessary for the missile's nose-cone to survive the tremendous heat of re-entering the earth's atmosphere from an altitude of several hundred miles.

The intermediate-range ballistic missile project was launched initially in late 1955 as a joint Army-Navy effort and the Army Ballistic

Missile Agency was established at the Redstone Arsenal, Huntsville, Ala., as the developmental center.

In December 1956 the Navy was authorized to begin development of a separate IRBM, called the POLARIS, designed for shipboard use. Accordingly, the Army's program was redirected toward a weapon with land-based specifications only.

The Army has insisted that each step of JUPITER's development be thoroughly engineered and tested to make sure that the final weapon be as fool-proof and reliable as possible. Despite the amount of time this has required, JUPITER has been on schedule since its inception. In fact, two additional firings now have been planned over the number originally anticipated in the near future.

SERGEANT is one of the newer research and development projects. It will be the successor to the 4-year-old CORPORAL, with improvements over the older weapon's power, range, and accuracy. As a ballistic guided missile, SERGEANT will be invulnerable to electronic countermeasures. It will be capable of employment without considerations for weather, visibility, or terrain. The missile will travel at several times the speed of sound.

DART is a small, wire-guided missile for use against tanks and fortifications, with the power capability of smashing the largest tank known. It can be mounted on a jeep, giving it a fast, easy mobility, and its remarkable accuracy often permits single-shot hits. Progress in the past year has put the DART into limited production for further evaluation tests.

LITTLE JOHN's developmental progress during the year prompted an Army decision to equip the 101st Airborne Division with an early version of the weapon this summer. LITTLE JOHN is a small-caliber field artillery free rocket, designed for easy air transportation. It is highly reliable in all types of weather, with a range greater than the Army's family of cannon.

LACROSSE (fig. 8), a highly accurate guided missile, designed primarily to provide close support for troops in forward battle areas, reached the production stage during the year. The missile's launcher and guidance equipment are truck-mounted, giving the system a high degree of ground mobility.

HONEST JOHN, a large-caliber free rocket with a nuclear or non-nuclear capability and a range of 15 miles, has been operational for more than 3 years. Toward the end of fiscal year 1957, the weapon was being greatly improved with a lighter-weight design, better launchers, and greatly improved operational characteristics. These advancements will enhance HONEST JOHN's mobility and air-transportability and add to the ground commander's punching power.

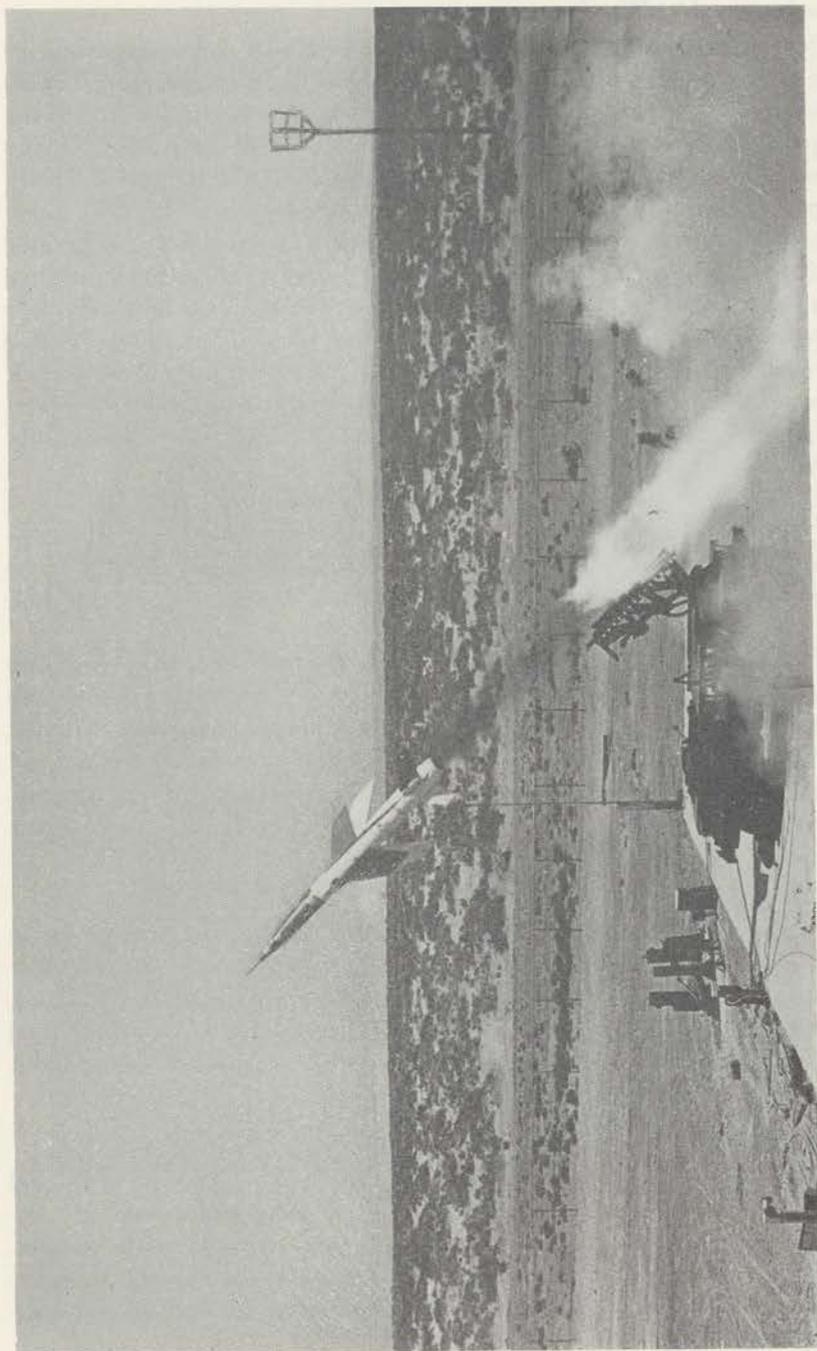


Figure 8. LACROSSE.

### *Surface-to-Air Missiles*

NIKE-HERCULES, formerly called NIKE B, is the second member of the NIKE anti-aircraft family. It will be replacing the operational NIKE-AJAX in batteries across the country. With the experience gained in the pioneering development of AJAX, Army Research and Development has produced in HERCULES a vastly superior weapon which will be able to attack enemy aircraft at much greater distances from the defended area. It can climb to greater altitudes and will have an even keener accuracy and maneuverability than AJAX. The greatest change will be HERCULES' nuclear capability, increasing the system's lethality and enabling defense forces to knock out whole formations of attacking aircraft. AJAX already was capable of destroying any known fast, high altitude aircraft. HERCULES thus puts American air defenses considerably ahead of enemy aircraft development.

Because of the planned similarity between HERCULES and AJAX, slight modifications in existing AJAX ground control equipment will make it possible for both AJAX and HERCULES to be fired from the same system, without changes in sites or personnel and with no major construction required.

HAWK (fig. 9), a new guided missile system, has been undergoing final tests during the year, and contracts now have been let for its production. HAWK is designed for maximum effectiveness against sneak raids by aircraft flying at very low altitudes, below the normal radar screen. An important feature is its transportability by aircraft or overland, permitting its use by troops in the field or within the United States air defense system.

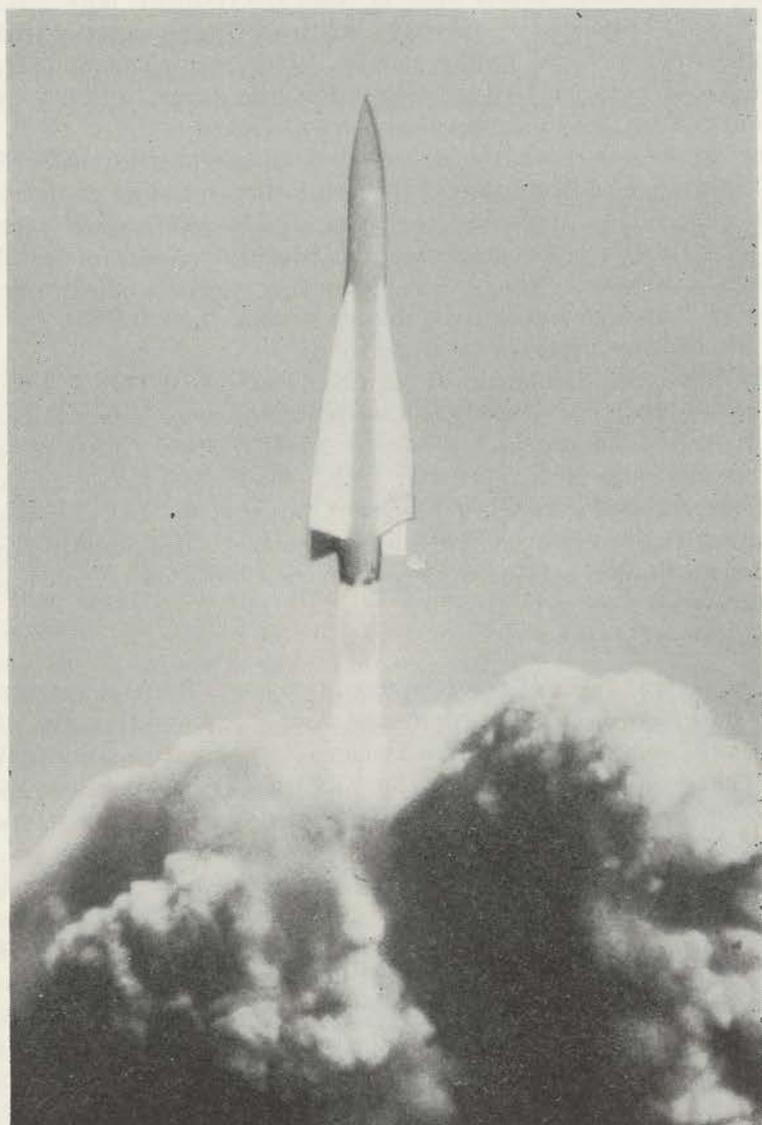
### *TALOS*

As a result of the roles and missions memorandum by the Secretary of Defense of November 26, 1956, the Army was assigned responsibility for the land-based TALOS missile, formerly under research by the Navy and the Air Force. The TALOS now is being studied by Army scientists with a view toward its possible future use in the Army air defense system.

### *Anti-Missile Missile*

As America's air defense personnel and weapons become more and more proficient against manned aircraft, it becomes increasingly apparent that any possible air attack will be attempted with missiles. The missiles probably will be ballistic, because of the ballistic missile's high speed, lack of warning, and immunity to normal counter-measures.

The task of detecting and destroying such a missile, therefore, is one of the most challenging to Research and Development.



*Figure 9. HAWK in flight.*

The need for a defense against ballistic missiles was recognized by the Army during World War II when the Germans launched the first V-2's. Extensive studies have indicated that the answer will be a high-speed, accurate, guided missile. The basic elements of such a weapon already have been developed by the Army in the pioneering work on surface-to-air missiles such as NIKE.

During the past year, the Army's anti-missile missile, the NIKE-ZEUS, progressed from the study state to the initiation of development work on an active defense system. Hardware developments and tests thus far have confirmed the feasibility and practicability of such a weapon. The Army is pressing work in the program urgently. Another anti-missile missile system, the PLATO, for use by the field army, also is in development.

ZEUS is under the technical cognizance of REDSTONE Arsenal and is receiving the concentrated effort of the same Army-industry team which developed and produced NIKE-AJAX and developed and is producing NIKE-HERCULES. Under the single management control of the Western Electric Company, the Bell Telephone Laboratories have been assigned overall research responsibility, and more than 24 other firms are working as closely coordinated sub-contractors.

### *Infantry Weapons*

After several years of rigorous tests, two new rifles and a new machine gun have been adopted by the Army, representing the most significant changes in the infantryman's weapons since World War II. The greatest overall advantages of the new weapons are more firepower and greater ease and speed of handling. All three weapons fire the 7.62 NATO cartridge.

—The M-14 rifle can fire on semi- or full-automatic, and therefore replaces not only the present M-1 Garand rifle but the carbine and submachine guns. It weighs 8.7 pounds—less than the M-1. Its magazine holds 20 cartridges.

—The M-15 rifle, in a highly efficient and economical engineering accomplishment, is the M-14 equipped with a heavier barrel and bipod, permitting its fully automatic use for longer periods and with greater accuracy than the M-14. It replaces the Browning Automatic Rifle, which has been in use for more than 35 years. It weighs 13.7 pounds, nearly 2 pounds less than the BAR.

—The M-60 general-purpose machine gun replaces three present weapons. It weighs 23 pounds, as opposed to 32 to 42 pounds for its predecessors, and can be fired with either a bipod or a tripod, or from the shoulder or hip. Its air-cooled barrel can be replaced in a matter of seconds.

Other new weapons and equipment include a 1-shot flame thrower, which is light enough to be jumped with a paratrooper and yet highly effective against bunkers and other emplaced positions; the "Dan Patch" mine planter, designed to lay extensive mine fields; and new radar equipment which can locate enemy mortars in seconds.

### **Mobility**

In the even greater importance given all types of mobility under the Army's Pentomic reorganization, Research and Development has expedited its pursuit of improved—and even revolutionary—equipment for the soldier's use in the air, on land, and on the water.

#### *Air Mobility*

One of the newest approaches the Army has taken to the problem of moving quickly from one area to another without consideration for terrain problems is the aerial jeep, a craft which probably will be in the shape of a platform with ducted fans or propellers permitting vertical takeoffs and landings and rapid forward movement. It probably will carry two men. Firm plans have been laid for prototypes of the new vehicle, which eventually may replace certain surface vehicles.

Other research for aircraft with better vertical takeoff and landing capabilities is directed toward four principal types, prototypes of which are being constructed. The test craft will be used to test unconventional aerodynamic and propulsion systems. The four types are called rotatable ducted fan, vectored slipstream, deflected slipstream, and the tilting wing.

For new aircraft with short takeoff and landing capabilities, the Army has developed a multi-winged aircraft configuration. Wind tunnel tests have been conducted and the results are under study with a view toward the possible construction of a prototype.

In the utility helicopter field, the Army completed the development of the H-40 Iroquois during the year and three prototypes are being tested. Six more have been ordered for fiscal years 1958 and 1959 for user testing. The Iroquois is designed to perform a wide variety of tasks in combat areas.

Research is continuing on the Flying Crane helicopter, which could carry 12-ton loads over short distances under combat conditions. During the year six contractors completed studies on the requirement and their findings are being reviewed toward the construction of such a helicopter in the forthcoming year.

In the Pentomic Army's need for shallow penetration flights over enemy territory for information and to acquire missile targets, the Army, in cooperation with the Navy, let a contract during the year for the development of the Mohawk, a higher-performance fixed-wing

observation airplane. Plans call for the plane to carry two men, cruise at approximately 300 miles an hour, and be able to take off and land on short unimproved fields near the combat area. It will be powered by two T-53 turboprop engines of a type successfully developed by the Army early this fiscal year.

Five Caribou twin-engined transport aircraft are being procured for evaluation. Manufactured by a Canadian firm, the plane can carry a 3-ton load at speeds of more than 200 miles an hour and can take off and land on short, unimproved areas. If finally accepted, the Caribou would replace the Otter currently in Army transport aviation companies, doubling the lift capability without materially increasing personnel and maintenance requirements.

#### *Land Mobility*

Improved means of land transportation are critical to the Pentomic concept, and to the end of providing faster, lighter, more durable, and less complex vehicles the Army has a variety of new types under study. Included are—

—The T113 armored personnel carrier, a lightweight vehicle designed primarily to provide infantry mobility but which also can be used as a rocket-launcher carrier, a self-propelled weapons carrier, a mortar carrier, an antitank missile carrier, ambulance, communications vehicle, command post vehicle, cargo carrier, and fire direction center. Pilot models are under test.

—A family of trucks in the 1-ton, 1½-ton and 2½-ton classes, each with interchangeable basic components so that the maintenance and parts-support requirements will be reduced materially. Test vehicles are undergoing rigorous tests.

—The XM151, an improved jeep, which weighs 500 pounds less than the older model and which can be air-dropped with a minimum rigging.

Two new tanks are under study. They are the lightweight T92 and the medium T95, both of which promise improvements in speed and mobility and greater adaptability to the Pentomic requirements.

#### *Water Mobility*

In December 1956, the keel was laid for a prototype beach lighter for landing trucks, tanks, and other vehicles in combat operations. Plans call for the model to be completed after July 1, 1958. It will be 338 feet long with a beam of 65 feet. It will be able to cruise at 12 knots for a range of 4,800 miles.

#### **Communications**

To provide the Pentomic Army with a new order of electronic "eyes and ears" for future warfare, research and development is

establishing new concepts of communications for all purposes and new standards of proficiency.

Some of the latest advancements include the following:

—Combat Surveillance Radar Sets. Four types are under development. The smallest can be carried by one man. It gives an audio signal to identify objects moving in the path of its beam and therefore is valuable for guarding against infiltration movements by enemy forces. It has a range of 1,000 to 2,000 yards for personnel and over 4 miles for vehicles. The next size requires three men and can be used for surveillance and target detection for ranges up to 9 miles. The third size, which is mounted on a truck, will detect moving vehicles to a depth of 22 miles, and the aircraft-mounted equipment can detect moving vehicles to ranges of 40 miles.

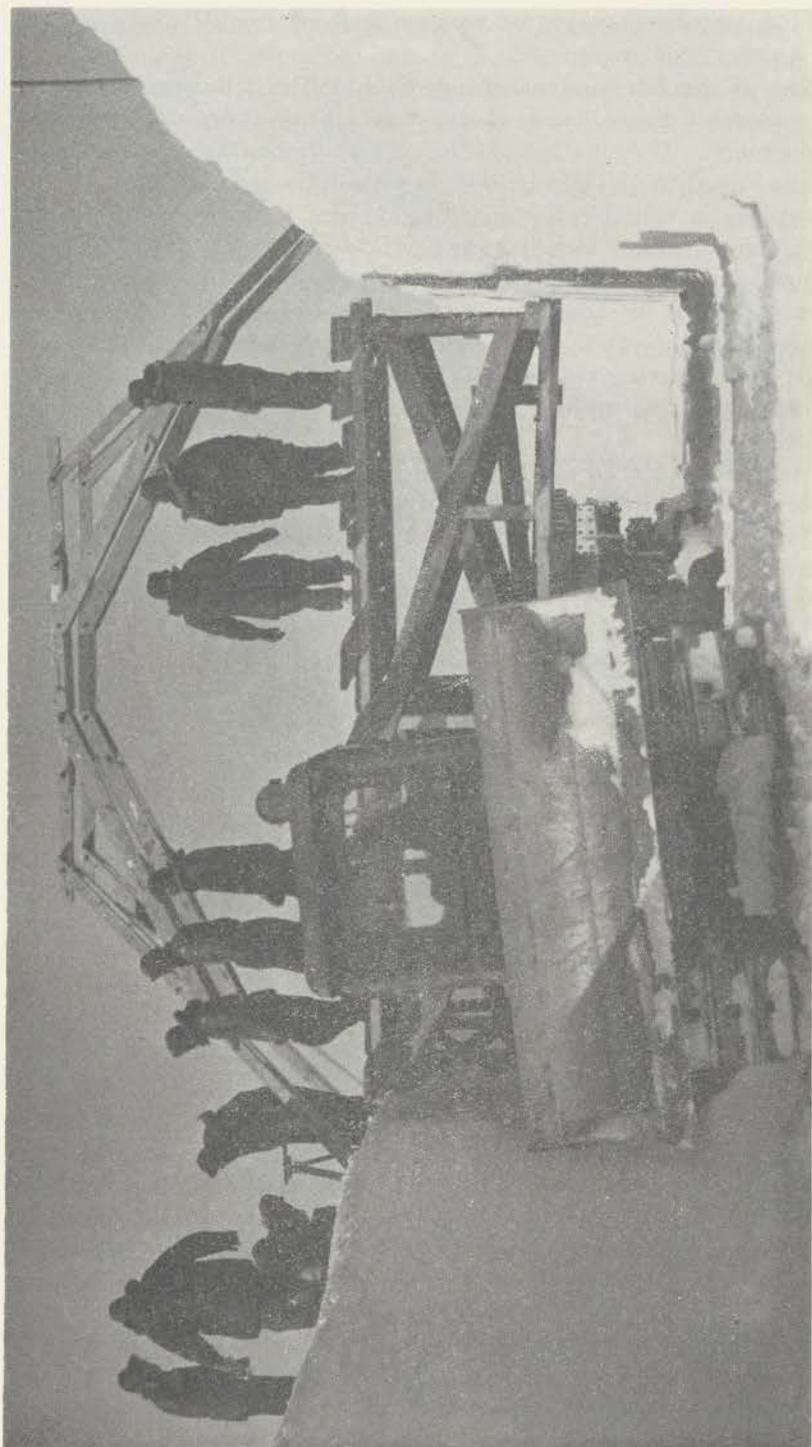
—Surveillance Drone Program. Because of the great effectiveness of antiaircraft missiles and other weapons, the penetration of enemy territory by piloted aircraft for reconnaissance purposes may become prohibitively costly in manpower and equipment. During the past year, therefore, the Army continued its program of developing pilotless drones which could carry a variety of television, photographic, or radar equipment to report on enemy positions. Much smaller than standard aircraft and built of non-reflecting materials, such drones would be very poor targets. The Army's program is aimed toward the development of guidance, navigation, and sensory components, as well as the vehicle itself.

—Telescopic Missile Tracker. In simple terms, this instrument is a camera equipped with a high-quality telescopic lens and geared to a radar tracker, so that relatively clear, close-up pictures can be made of missiles in flight. The development is particularly valuable in missile research at the White Sands Proving Ground.

### **Polar Research**

The Army's interest in cold weather operations goes back to World War I when the first ski troops were trained. Early in World War II, in Canada, Alaska, Greenland, and Iceland, the first problems of construction in Arctic and subarctic areas were defined and since then the Army has pressed programs of applied and basic research on Arctic conditions, the nature of ice and snow and the extent to which they can be used for construction, and the requirements for man to survive and fight in sub-zero temperatures. (See fig. 10.)

One notable accomplishment evolving from this work was the Army's successful construction, after the outbreak of the Korean war, of the Thule Air Base in the northern half of Greenland, using entirely new techniques and completing it in record time. A second



*Figure 10. Arctic construction experimental work.*

achievement was the revolutionary construction of a complete base in the icecap, where no standard construction foundations are possible, using a submarine-like pressure hull structure.

More recently the Army began experiments in tunneling into the Greenland icecap for transportation, billeting, and storage purposes. During the past year, Army military and civilian scientists succeeded in constructing rooms of uninterrupted space 60 feet square and 23 feet high inside the icecap. The temperature in these rooms remains fairly constant between 13° and 17° above zero, permitting a variety of living, mechanical, and storage operations, while the temperature on the surface of the icecap, some feet above, is as low as 65 degrees below zero.

In the expedition of the Navy's Task Force 43 into Antarctica during the past fiscal year a number of Army developments were used successfully. One has resulted in the Navy's recommendation of an award for an Army scientist.

Army trail blazing and trail marking techniques—critical for transportation and safety in the icy wastes—were employed by the Navy group, along with Army developments in equipment, to detect invisible crevasses in the snow and ice.

Dr. Andrew Assur, of the Army's Snow, Ice and Permafrost Research Establishment (SIPRE), was recommended for the Navy's highest civilian award after he helped save the ice airfield at McMurdo Sound, the resupply point for Little America. The runway, constructed of sea ice, began to break up at a critical point in the Navy's operations. It appeared that the base might have to be abandoned. Via radio the Navy asked for Dr. Assur on an emergency basis. The Army scientist left in a matter of hours and was flown, with stops only to refuel or change planes, the 7,000-odd miles to the South Pole where he immediately began to supervise repair work on the runway.

Taking advantage of the higher freezing point of fresh water ice as opposed to salt or sea water ice, Dr. Assur reconnected the separated sections in the airfield by pouring fresh water and fresh water ice into the breaks. The Navy's operations thus were able to continue.

In a similar instance during the year the Army also provided emergency engineering aid for the Air Force when a runway on Fletcher's Ice Island in the North Polar Sea proved unsatisfactory. Personnel of the First Army Engineer Arctic Task Force provided the necessary help to repair the airstrip.

### **Nuclear Research**

Since the Army's successful construction of the first nuclear weapon during World War II, Research and Development has continued to expand its studies and refinements of nuclear fission principles for

all purposes—military and peaceful. Advancements were made in the past year in the development of smaller-yield weapons, in studies of nuclear weapon effects, in the use of nuclear power for the production of heat and electricity, and in using nuclear emanations for food preservation.

#### *Nuclear Weapon Effects*

During the year the Army continued detailed studies aimed at improving its ability to operate effectively on an atomic battlefield. These studies involved the collection and evaluation of basic phenomenology associated with the effects of atomic weapons and including the responses of individual personnel and various types of equipment to these effects. Not only was extensive work accomplished in the Army's technical laboratories but a number of projects also were conducted in conjunction with Department of Defense Weapons Effects Programs during full-scale atomic weapons tests at Eniwetok (Operation REDWING) and at the Nevada Test Site (Operation PLUMB-BOB). Particular emphasis was placed upon the development of ways and means of coping with the damaging effects of nuclear radiation by development of improved radiac instruments, shielding materials, and techniques and equipment for prediction and warning systems, as well as procedures for decontamination of equipment and materiel.

#### *Package Reactor*

The Army's package power reactor—a prototype designed to provide heat and electricity for military installations—was put into operation during the year and tied into the Fort Belvoir, Va., electrical system. (See fig. 11.)

The reactor produces 1,825 kilowatts, enough for a town of 5,000 people, and its useful life is estimated to be 20 years.

The Belvoir plant is the first of several designs being developed jointly by the Army and the Atomic Energy Commission. Development effort is directed toward making later models more air transportable so that plants can be flown into remote areas and erected with standard field construction techniques.

Also during the year the first Army personnel trained specifically to operate the reactor completed their 5-month courses in military schools and at private universities and industrial firms. The 29 military men and 1 civilian, the first of several groups to be trained in the work, are engaged in operating the Belvoir plant and in training other crews.

#### *Food Preservation*

Several years of successful research and development work resulted in the establishment of the Army Ionizing Radiation Center at Sharpe General Depot in Stockton, Calif., during the year.



*Figure 11. Interior of Army Package Power Reactor Plant.*

Purpose of the plant is to further test the technical and economical feasibility of using ionization radiation to preserve foodstuffs—by killing or inactivating micro-organisms which cause spoilage—in meaningful quantities for military and civilian needs.

Tremendous savings in the storage and shipping of foodstuffs are anticipated if the plant is as successful as Army scientists anticipate.

During the year a contract was let for the construction of the high-power, traveling-wave electron accelerator for the plant. The accelerator—capable of producing 18 kilowatts of radiation power at 24 million electron volts—will be the most powerful ever constructed. It also will be used for ionizing radiation studies on leather, textiles, and other materials in addition to foodstuffs.

## IV. Manpower

These were the principal developments during the past year:

- downward adjustments of manpower increased problems of personnel management in relation to Army assignments;
- enlistment and reenlistment rates dropped;
- the supply of technically-qualified men fell farther below the demand level;
- training for the Pentomic Army was expedited sharply;
- missile training increased more than 50 percent;
- nearly 100,000 men took part in training exercises around the world;
- the basic training workload posed critical difficulties;
- more than 100,000 personnel graduated from various Service schools;
- health of the Army was at an all time high;
- civilian personnel was reduced;
- the shortage of civilian scientists remained critical;
- the Ready Reserve objective of cutting overall strength to 1,448,000 was reached, while the National Guard and Reserve units increased;
- total enlistments under the Reserve Forces Act of 1955 totaled 162,565 since the act was passed;
- the Army won the National Safety Council's Award of Honor for the fourth consecutive year.

### **Military Personnel**

While fiscal year 1957 was a period of progress toward a number of manpower objectives, major problems in overall personnel management became increasingly more difficult.

In seeking to balance authorized personnel against the Army's assignments, the broad task is to maintain an increasing degree of effectiveness so that the risks incurred in overall manpower reductions are minimized. The challenge must be viewed against the environment of these factors:

Continued world tension precludes any appreciable change in the Army's transcendent responsibility of maintaining global deployments—in combat readiness—as a principal deterrent to war.

The workload on Army manpower is being increased, such as in the added reserve training requirement.

Longer training periods are required, and for a greater number of personnel, to meet the Army's technological needs.

Attractions of private industry compound the problem of personnel turnover.

While the Army accepts the fact that the ultimate resolution of the broad problem lies beyond the scope of its authority, it clearly recognizes its responsibility in the interests of national security for greater productivity and efficiency by all Army personnel and has moved purposefully to achieve this goal.

In March 1957 the Deputy Chief of Staff for Personnel issued a statement of major importance. In part, it lists military "Personnel Objectives" as follows:

To seek optimum personnel utilization for maximum effectiveness and combat power and to maintain optimum balance with technical advances in Army weaponry.

To decentralize responsibility and delegate commensurate authority, and yet to develop unity of purpose among all Army personnel.

To attract more officers and enlisted men of the high caliber of professional and technical skill required to man the modern Army.

To retain in the Army a maximum number of high caliber officers and enlisted personnel.

To obtain remuneration for Army personnel commensurate with their responsibilities and sufficient for a satisfactory standard of living.

To improve morale by eliminating procedures which reduce prestige, by developing procedures which increase job satisfaction.

To improve personnel evaluation.

To develop procedures for insuring that all personnel are assigned and employed in accordance with their training and abilities.

To develop promotion systems for high incentive and for the advancement of the most qualified.

To improve the quality of Army personnel by the elimination of those not performing in accord with established standards.

### *Strength*

Army strength dropped 27,784 during the year, from 1,025,778 to 997,994.

Following is a general breakdown of this figure as of June 30, 1957:

Male Commissioned Officers (including 125 nurses and medical specialists) .....	95,520
Male Warrant Officers .....	11,093
Male Enlisted Men .....	877,900
	<hr/>
	984,513

# ARMY MANPOWER

## DISTRIBUTION OF MILITARY PERSONNEL - 30 JUN 57

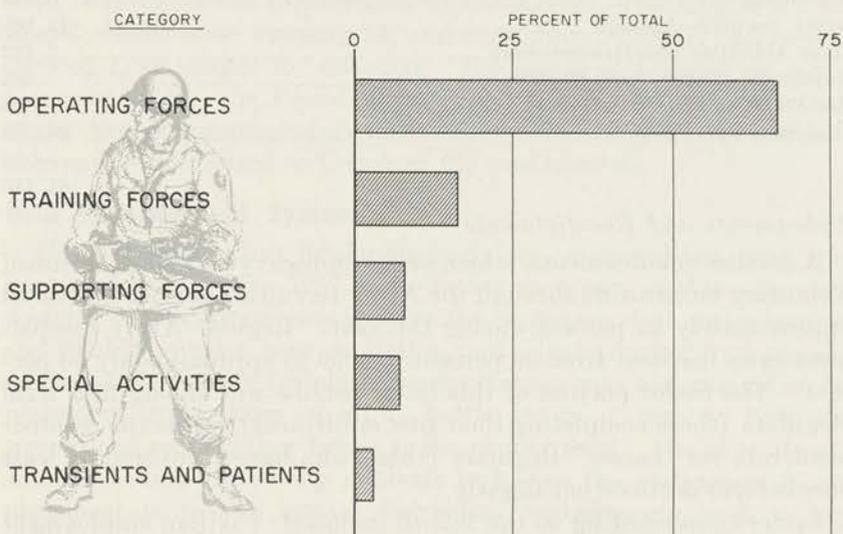


Figure 12.

USMA Cadets.....	1,751
Women's Army Corps, Commissioned Officers.....	808
Women's Army Corps Warrant Officers.....	43
Women's Army Corps Enlisted.....	7,156
	<hr/>
	8,007
Women Doctors.....	9
Nurse Corps (female).....	3,269
Medical Specialist Corps (female).....	436
Medical Service Corps (female).....	9
	<hr/>
	3,723

Overall manpower was distributed as follows:

	June 30 1956 (percent)	June 30 1957 (percent)
Operating Forces.....	69.2	65.8
Supporting Forces.....	8.7	9.3
Training Forces.....	13.4	16.6
Transients and Patients.....	2.4	2.2
Special Activities.....	6.3	6.1

(See fig. 12.)

The above Special Activities group, in which the Army absorbs many activities not contributing directly to the Army mission, is broken down as follows:

Army Construction Engineer Battalions (in support of Air Force) -----	9, 178
Attaché System -----	430
MAAG's and Missions -----	6, 122
Recruiting -----	3, 813
Army Security Agency -----	13, 105
Joint Activities and Headquarters -----	2, 732
Engineers (Rivers and Harbors) -----	585
Air Force and Navy Activities -----	609
Miscellaneous -----	24, 536
	<hr/>
	61, 110

#### *Enlistments and Reenlistments*

A decline in enlistments, which began in fiscal year 1956, continued Voluntary enlistments through the Army recruiting service decreased approximately 25 percent during the year. Regular Army reenlistment rates declined from 59 percent in 1956 to approximately 50 percent. The major portion of this latter decline was among first term Regulars (those completing their first enlistment), while the reenlistment rate for "career" Regulars (those who have reenlisted at least once before) declined but slightly.

Factors contributing to the fall-off included: Civilian employment opportunities; higher standards for Regular Army enlistment and reenlistment; attractiveness of the reserve component programs; utilization of the Army recruiting service to assist in reserve component personnel procurement; loss of the motivating effects of the Career Incentive Act of 1955; and the absence of an "inservice" recruiting force.

To reverse the trend the Army is establishing higher standards for selection of recruiting personnel, both officer and enlisted; improved recruiter training; improved operating and supervisory procedures in the recruiting service; increased Army participation in educational conventions to obtain enlistment of more high school graduates; improvement of physical surroundings of main recruiting stations; re-orientation of the recruiting publicity campaign based on findings of three separate research studies; increased reenlistment publicity material; and the establishment of a full-time reenlistment sales force throughout the Army.

#### *Regular Army Officer Strength*

There was no significant increase in the strength of the Regular Army male and WAC officer corps as a result of the increased ceilings authorized by Congress. The major effort during the year was

to expand the procurement effort from the ROTC Distinguished Military Graduate Program and to process applications submitted under the provisions of the Augmentation circular. The first tangible results of the increased procurement efforts will begin to show in the first quarter of the next year.

In the Regular Army Augmentation Program, 19,593 applications were received in the Department of the Army. The Augmentation Board convened on January 14, and as of June 30, 1957, had recommended 1,069 officers for selection. The names of 1,032 of the selectees were sent to the President on June 27, 1957, with the Secretary of the Army's recommendation that these names be placed in nomination and be submitted to Congress for confirmation.

### **Unit Replacement System**

The Battlefield Unit Replacement System proposed last year, was approved during May 1957 and adopted as a part of Army tactical doctrine. The system provides for the replacement of entire combat and combat support units, as well as individuals, during war, and the system envisions the training, transportation, and assignment of replacement units, from squad to battle group in size, to keep the strength of our fighting forces at the proper level. Under study are automatic data processing methods to hasten the assignment of replacement units and certain individual replacements, such as key technical specialists and senior combat leaders. Additional benefits of the system will be simplified administrative processing and improved control during movement to the combat areas, and improved morale of replacements who will be traveling in organized groups rather than as an aggregation of strangers.

### **Combat Arms Regimental System**

Concurrently with the physical reorganization of Army units under the Pentomic plan, Army symbolism and language are being modernized. With the aim of eliminating obsolete and antiquated Army terminology, a large number of specific actions were taken during the year. These include the elimination of machine records jargon on the designations of certain units, i. e., giving them a more distinctive name than a series of letters and numbers; the adoption of new insignia for the artillery to include missiles; the adoption of new names for the artillery schools and centers, and a new designation for the Army component of the Continental Air Defense Command.

At the same time, to the end of giving each combat arms soldier a home unit, a total of 164 Active Army regiments have been chosen

for permanent retention on the Army's rolls. They include 55 infantry, 81 artillery, 27 armor, and 1 for Special Forces units. An extension of the system to other Army branches is under consideration. In addition to these regiments of the Active Army and Reserve units, Guard regiments will be selected for the National Guard.

### **Training**

The Army's need for technically-skilled manpower has been growing continually since World War II. Even before the Pentomic Army concept was developed and the reorganization launched, the relative need for men to man the complex weapons and electronic equipment so critical in the execution of modern warfare was higher than at any time in the Army's history.

The development during the past year of the Pentomic concept has compounded and multiplied the need. Measured against this greatly enlarged demand for manpower proficient in communications, aviation maintenance, guided missiles, radar, infrared uses, surveillance equipment, television, and new fire controls, are these problem factors: A shortage of personnel with technical aptitudes; expanded need for specialized training facilities; the long lead-times necessary to train men in many skills, and the fact that a relatively low percentage of trained personnel remain in the Army when their enlistments have ended. Though the Army is carrying forth urgent measures against the problem, it does not expect that the need can be met fully in the near future.

#### *Scientific Personnel*

Beyond the need for technically-trained manpower is a demand of equal importance for scientific and professional personnel. In 1948 the Army launched the Scientific and Professional Personnel Program, which has the purpose of identifying, assigning, and utilizing enlisted men with training and/or experience in engineering or professional fields. The program provides that these men work with senior Army civilian scientists—also in short supply—to further develop their particular qualifications. During the past year, approximately 5,000 men received such assignments. In addition to broadening their own training, they were aiding materially the expedition of various Army scientific projects.

#### *Pentomic Training*

Training for the Pentomic Army has moved ahead with increasing momentum at a variety of different levels during the past year. Even as combat units were undergoing the shifting and reshaping necessary for the pentagonal division, the men in each unit were being retrained to the fluid, hard-hitting action the new concept will per-



*Figure 13. Tank hit by simulated mine explosion.*

mit, and, concurrently, the new doctrine was being tested and practiced in field exercises. On other levels, all available classroom facilities were being employed fully.

An important step was the establishment of the Army Combat Development Experimentation Center (CDEC) at Fort Ord, Calif. This center was set up in the Army's recognition that the Pentomic concept actually is only the beginning of the changes necessary in the Army, and recognition that changes must continue indefinitely if the Army is to maintain the power and flexibility to fight and win in any type of war.

As part of the Continental Army Command, the purpose of CDEC is to continue developments and experiments with new tactical organizations, doctrine, and procedures. Hypothetically, CDEC might use its test troops—consisting of headquarters, engineer, medium tank, and infantry companies, a battle group, and ordnance and signal platoons—to try out a divisional structure of 6 sides or 7. Or organizational tests might be carried out around new missiles and other weapons.

Wherever a firm and clear-cut improvement is found it will be tested further in major field maneuvers and then adapted to the entire Army.

#### *Field Exercises*

A major field exercise carried out in the past year to test the Pentomic organization was Exercise KING COLE in the Louisiana

maneuver area (fig. 13). Approximately 26,000 Army troops took part in the 3-week operation, which had the purposes of (a) providing commanders with training in combat operations under assumed conditions of extensive chemical, biological, radiological, atomic, and electronic capabilities on both sides; (b) providing realistic training for special weapon units; and (c) providing troop tests of organization, doctrine, and techniques.

Other exercises during the year included the following:

—Exercise SLEDGE HAMMER, in which nearly 7,000 men of the 1st Armored Division took part in testing the organization and functions of the sky cavalry and tests of bulk POL distribution procedures. The Army's plan of helicopter-borne patrols behind "enemy" lines was highly successful. The exercise also indicated means for improving the POL distribution for tanks.

—Exercise RED ARROW, conducted by the 1st Infantry Division as exercises for three regimental combat teams with emphasis on battlefield mobility and atomic warfare.

—Exercise RIO SELVA, carried out in the Panama Canal Zone by a battalion combat team from the 82nd Airborne Division. The purposes of this operation were to test plans for reinforcing the Canal Zone and to give troops experience in jungle warfare.

—Exercise COLD SPOT, when a battalion from the 1st Infantry Division spent 10 weeks training in high Colorado mountainous terrain.

For the purpose of making its European exercises more realistic, the Army has special troops trained, dressed, and practiced in the mannerisms of foreign aggressor forces. Pitted against standard Army troops in training operations in Germany, these troops give a particularly realistic semblance to mock combat situations. In Germany, police and Bundeswehr troops cooperate in training exercises as "enemy" forces.

#### *Service Schools*

Effects of the increased need for trained specialists are especially noticeable in the student loads at schools such as the Air Defense School, Ft. Bliss, Tex., and the Artillery and Missile School at Ft. Sill, Okla. The Ft. Bliss enrollment climbed from 2,372 at the end of fiscal year 1956 to 3,850 in May 1957. At Ft. Sill, the student load increased from 1,220 at the end of fiscal year 1956 to 2,462 in March 1957.

The total output of Army personnel at all available Service schools and other institutions during the year was as follows:

Army Schools.....	140,833
Navy Schools.....	755
Trade Schools.....	15
Joint Courses.....	3,629
Joint Colleges.....	201
Air Force Schools.....	2,334
Civilian Institutions.....	83
Industrial Organizations.....	1,503
	<hr/>
	149,353

#### *U. S. Military Academy*

West Point also began some curriculum shifts toward the Pentomic Army. While the bulk of the Academy's courses in academic subjects such as mathematics, science, and history will remain unchanged, amendments to the tactical doctrine instructions are being effected, principally through new summer training courses, by which the cadets receive orientation in missiles and atomic warfare at different Army installations across the country.

A total of 546 cadets graduated in June 1957. In consonance with Defense Department policy, 25 percent were assigned to the Air Force.

#### *Basic Training*

One of the more pressing problems in training is the tremendously increased recruit-training workload. During fiscal year 1957 the Army provided basic training for a total of 359,756 personnel, as opposed to 242,114 during 1956, a jump of nearly 50 percent. To meet the demand for proportionately more instructors and trainers the Army was forced to pull qualified personnel out of combat units, somewhat weakening the war readiness of those units, and some training facilities were strained to meet the demand.

The two principal reasons for the increase were a heavy turnover in Active Army personnel and an almost phenomenal jump in the workload of training additional men under the Reserve Forces Act of 1955.

During fiscal year 1956, the Army trained 227,748 recruits other than RFA. The RFA requirement during that year was only 14,366, providing a total of 242,114.

During fiscal year 1957, the Active Army turnover required the training of 283,807 men, exclusive of RFA, an increase of approximately 23 percent over 1956.

The fiscal year 1957 RFA training requirement was 75,949, an increase of 61,583 or nearly 550 percent over 1956.

RFA is most essential to national security—a plan the Army supported vigorously—but it cannot be denied that the growing work-

load on Army manpower is having an impact on the Army's overall combat posture, posing the challenge of achieving a balance between the Active Army's combat and training responsibilities. In clear recognition of, and as a part of, the Army's dedicated effort to produce the greatest possible defense for every dollar of its appropriation, the Army would be somewhat derelict if it did not point out that the current imbalance between training load and combat readiness, if continued, could invite a condition of false economy. It could lessen America's ability to strike back quickly and effectively in the event of a national emergency, and it could reduce the value of the reserves themselves, whose greatest value is manifested in the event of war through the efficient organizational structure and advanced combat know-how of a strong Active Army.

#### *Women's Army Corps*

In an effort to maintain its level of higher-type personnel, the Women's Army Corps (see fig. 14) launched the College Junior Program during the year. It permits qualified women completing their junior year in an accredited college or university to enlist in the Army Reserve for a 4-week course at the Women's Army Corps Center at Ft. McClellan, Ala. Women successfully completing this course may apply for a commission as a second lieutenant upon their graduation from college. Then they attend a 20-week basic course before being assigned to active Army duty for 2 years.

The Corps, entering its fifteenth year, meanwhile continued its high level of efficient service to national security. Of the total Corps strength of 8,007 at the end of the fiscal year, approximately 23 percent were on overseas assignments in Europe, at Pacific bases, and in the Far East.

#### **Morale and Health**

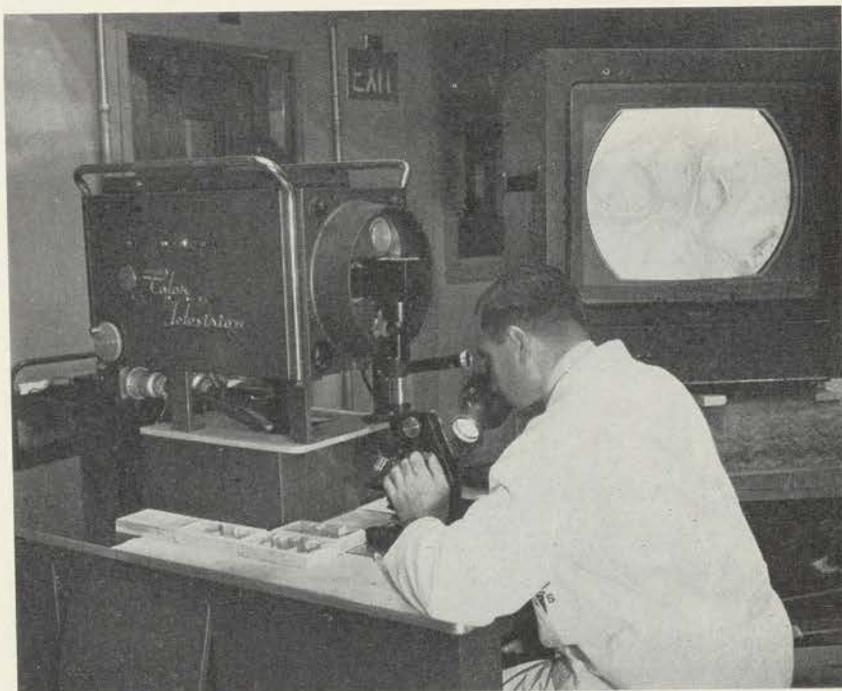
Army morale generally was good during the past year. A major factor was the Servicemen's and Veterans' Survivor Benefits Act for survivors of military personnel. Passed early in fiscal year 1957, this law provides a well-balanced program of survivor benefits and gives military personnel complete coverage under Social Security, including income at age 65. The Dependents' Medical Care Act, which became effective in December 1956, also has been a morale booster. As of the end of fiscal year 1957, 69,000 claims had been made under the act at a cost of \$6 million.

Another factor was progress in the housing program, which though still considerably below overall needs, advanced appreciably during the year. (See ch. V.)

Under the GYROSCOPE program, the 8th Infantry Division at Fort Carson exchanged posts with the 9th Infantry Division in Europe,



Figure 14. Women's Army Corps radio operator.



*Figure 15. Microscopic studies using television.*

and the 6th and 11th Armored Cavalry Regiments changed places between Fort Knox and Europe. In addition, 50 other units, of battalion size and smaller, changed positions between the United States and foreign stations.

The health of the Army set an all-time record during the past year. A daily average of 12.5 men per 1,000 of troop strength were off duty because of illness, compared with 13.4 during fiscal year 1956 and 13.6 in fiscal year 1955.

A variety of factors have helped bring about this condition, with one of the most important being Army advancements in military medicine. (See fig. 15.) Some of the achievements of the past year include:

- a new means of storing whole blood, extending the storage period from 21 to 60 days;
- mobile dental vans to provide dental care for isolated and widely dispersed troops, such as at NIKE stations;
- a device to provide artificial respiration for nerve gas victims, or for drowning, electrical shock, or suffocation victims.

## Civilian Personnel

### *Scientific and Engineering Personnel*

The continued shortage of scientists and engineers remained the most serious consideration in civilian personnel. As in the need for technically skilled military manpower, it is a problem which has been intensified by the Pentomic Army requirements.

As of June 30, 1957, the number of vacancies for scientists and engineers, at grades GS-5 through GS-18, totaled 981. This is against 1,427 at the end of fiscal year 1956.

One of the principal difficulties is acute pay competition from private industry. As a means of meeting this problem, the Army has participated actively in Civil Service Commission studies which have resulted in limited pay increases in all grades. Instead of being hired at the bottom pay level of a particular grade, engineers and physical scientists are being employed at various, higher, in-grade pay steps. A current proposal is for the pay of all to be increased to the top of the grade.

In an effort to derive greater output from scientific personnel, utilization studies have indicated that in many instances such manpower can be relieved of nonprofessional duties, thus having more time to devote to engineering tasks. To this end, a guide for measuring the use and application of scientific skills has been prepared and sent to the field, along with procedures for reassigning nonscientific duties to lower-grade personnel.

A special survey of personnel management in Research and Development revealed some favorable conditions. Research and Development had had greater success in recruiting engineers, and the quit-rate for Research and Development personnel as a whole was found to be 12 percent less than the Army average. One reason for the lower turnover is the strong Army-team feeling between the military and civilian scientists. These good relationships also serve to encourage greater productivity by the Army's civilian corps. The survey also revealed certain deficiencies in recruiting and management, and corrective action has been initiated in a coordinated move on the Deputy Chief of Staff level.

Recruiting effort has been aimed at obtaining a larger share of new college graduates. Army recruiting personnel are working more closely with college placement staffs and cooperative work-study programs have been worked out. Under these programs students divide the year between working in Army installations and college. At present, agreements have been reached with 62 colleges, and 1,000 students are participating. Fifteen fields of engineering and science are represented.

*Civilian Career Programs*

The basic regulations pertaining to Civilian Career Programs have been prepared and cleared for publication. These will provide the basis for establishment and operation of career programs for the major civilian occupations both command-wide and Army-wide. They define responsibilities limited to individual commands, and also for functional areas common to more than one command, such as Comptrollership, Safety Management, Personnel Administration, and Transportation Services. Some 40 possible civilian career fields have been identified within the seven technical services.

Basic plans for command-wide programs have been published by technical services for certain occupations such as: Ordnance supply specialists; ordnance storage specialists; ordnance engineers and scientists; and Corps of Engineers real estate, supply, and engineers.

The Army Audit Agency has established career programs for Auditors under its jurisdiction.

*Wage Board Pay System*

In May the Army-Air Force Wage Board agreed to adopt a non-supervisory wage board grade structure consisting of 15 grades. The new structure will resolve disparities between Army and Air Force grade level standards and will improve pay relationships with the Navy and with the industrial market. The Board also agreed that certain other improvements in the wage board pay system, under study during the year, be installed in relationship to the new grade structure. These improvements include the step-rate plan, revision of the Supervisory Evaluation Standard, and a new pay plan for working leaders. Studies on the means for implementing the new grade structure and these related changes were initiated.

*Program Evaluation*

To the end of attaining maximum efficiency in personnel management, the Army conducts regular command surveys of field installations. Problems and sometimes problem patterns are defined, and if the difficulty cannot be solved or overcome in the field, corrective action is sought from the Washington level. During the past year, command surveys were carried out in the following commands or activities: U. S. Army Europe, U. S. Army Alaska, Third Army, Military District of Washington, Engineer Corps, Chemical Corps, Signal Corps, and Transportation Corps.

*Research and Study Fellowships*

The Secretary of Army's Research and Study Fellowship Program, announced during the past year, already has permitted nine civilian employees to begin special study projects.

Of the 69 other applications received since the program was begun in August 1956, 14 have been approved, 25 rejected, and 30 are under consideration. Of the total of 23 approved, 5 are engineers, 8 are scientists, 5 are administrators, and 5 are technical specialists.

The program, a significant career incentive project, is designed to emphasize the recognition, development, and increased use of creative talents available among the Army's civilian employees. Fellowships are won in Army-wide competition. They enable outstanding employees to devote up to 12 months in independent research on problems related to their prior experience and connected with their Army work, with a view toward benefiting national defense.

The research may include study at a university in this country or abroad. Winners continue to receive their salary for the full period they are away from their regular duties, and cost such as tuition and travel are paid by the Army.

Valuable achievements are expected from the program in a variety of national defense and Army problems, in deriving even greater benefits from the Army's civilian component, and in integrating with more effectiveness the civilian corps with the military.

#### *Civilian Mobilization*

Considerable progress was made during the year in the development of advanced plans for the mobilization of civilian personnel in the event of national emergency. Regulations covering planning steps now and actions to be taken in the event of war were issued. Noteworthy was the establishment of a unit of the National Defense Executive Reserve within the Army. This will permit the peacetime appointment and training of top civilian executives from private industry, so their mobilization, assignments, and work can be carried forth quickly if the need should arise.

#### *Overseas Affairs*

There were significant developments in the employment and administration of local nationals in overseas areas during the year. In Germany, a satisfactory labor portion of the overall Status of Forces Agreement was negotiated and completed. In accordance with arrangements completed with the Department of Labor, Korean employees of the United States forces now are covered under the Employees Compensation Act, permitting death and injury claims, accumulating since 1954, to be settled. A training course for supervisors of local national personnel was developed to acquaint such personnel with their responsibilities and opportunities for maintaining harmonious international relations.

*Incentive Awards Program*

The responsibility for administering the Army Incentive Awards Program was assigned to the Deputy Chief of Staff for Personnel as an integral part of the manpower program during the year. To stimulate the program, the objective of which is to encourage employees' ideas on management problems and operational efficiency, these actions were taken:

- regulations for administering the program were revised;
- promotional materials were disseminated; and
- an information campaign was conducted. Termed "Project Paydirt," the campaign called for Army-wide promotion activities, including 19 regional conferences attended by military and civilian leaders from nearly all Army installations in the United States.

*Civilian Personnel Strength*

The total number of Army direct-hire civilian personnel dropped from 434,691 at the end of fiscal year 1956 to 429,217 at the end of fiscal year 1957. Of this total, the number overseas went down from 65,214 to 62,505, and the number within the United States declined from 369,477 to 366,712.

The number of overseas contract-hire employees—foreign nationals hired at local prevailing wage rates—dropped from 185,392 to 170,377.

**Reserve Forces**

The past year was one of impressive accomplishment in the Army's Ready Reserve forces, which include the National Guard; the Army Reserve members actively participating in reserve unit training; and those Army Reserve members not participating in training. In addition are the largely inactive Standby and Retired Reserve classifications.

Under the requirement that the Ready Reserve strength of the entire Defense Department not exceed 2,500,000, the Army in November 1956 was assigned a ceiling of approximately 1,448,000. As of June 30, 1957, this goal had been met, largely through the screening of Army Reserve personnel not participating in unit training. The guide for the screening program was the retention of those men who, for reason of training, skills, etc., would be in the greatest demand in the event of mobilization.

By the end of the fiscal year, approximately 500,000 men had been discharged from the Ready Reserve and 650,000 had been transferred to the Standby or Retired Reserve, so that the total number of reservists not participating in active units dropped to approximately 738,000 during the year. Concurrently, there was a sharp increase, approximately 95,000, in the number of in-unit reservists to a year-end level of 687,000. The Army Reserve portion of the Army Ready Reserve

# ARMY RESERVE COMPONENTS

## STRENGTH OF THE READY RESERVE

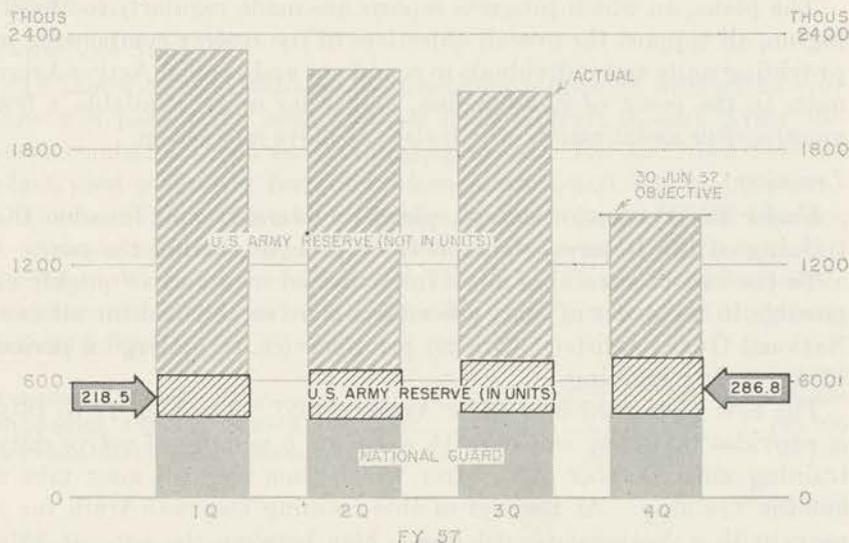


Figure 16.

therefore totaled 1,008,000, with the June 30, 1957, 442,000 \* level of the National Guard constituting the balance of the 1,450,000 figure. For fiscal year 1958, Defense Department directives will require an adjustment of the National Guard level to 400,000 and an increase in the Army Reserve in-unit figure to approximately 300,000.

The total number of Ready Reservists participating in training as members of units increased by about 100,000 men during fiscal year 1957. Of this total, the number of Army reservists in units increased by more than 68,000. (See fig. 16.)

The strengths of the Standby Reserve and the Retired Reserve were 775,000 and 57,000 respectively at the end of the year.

### Mobilization Plans

To insure smoother and quicker employment of Reserve components in the event of war, the Army made improvements in its mobilization plans and procedures during the year.

A principal element, the Emergency Reinforcement Plan, provides for the maintaining of certain priority Reserve component units in an advanced status of readiness. These units are of a specialized type

\*Including inactive personnel.

that would be required to move out quickly after war was declared.

The classification of certain mobilization plans was lowered during the year, permitting the Army National Guard Bureau to forward the improved procedures to all states and the District of Columbia. The information now can be disseminated more easily and preparations can be carried out more efficiently at the unit level.

The plans, on which progress reports are made regularly to Washington, all support the overall objectives of the reserve components in providing units and individuals to round out and expand Active Army units in the event of mobilization, and other units, available a few months after mobilization, which also can move into action.

### *Training*

Under the Pentomic concept, plans to intensify and broaden the training of the Reserve components were begun during the year.

To the end of obtaining more fully-trained men and as quickly as possible in the event of war, procedures were established for all new National Guard enlistees, with no prior service, to undergo a period of active duty training.

The new plan went into effect April 1, 1957. For men 17 to 18½ it provides that they can take 11 weeks or 6 months of active duty training until October 1957, after which time they all must take 6 months' training. At the end of this training they will train for 3 years with a National Guard unit. Men between the ages of 18½ and 25 must take 6 months' training and then train in a unit for 5½ years. Men 26 and over must take 6 months' active duty training and then train in a National Guard unit for 2½ years.

During the summer of calendar year 1957, special Officer Candidate Schools were opened for members of the Army Reserve. Consisting of two courses—9 weeks of infantry training and 11 weeks of artillery training—the new program affords Army Reserve warrant officers and noncommissioned officers opportunities comparable to those in the National Guard for officer schooling.

The Army Reserve also laid plans to commission 13,500 Reserve Officer Training Corps graduates during fiscal year 1958, including 700 men with distinguished records who will accept commissions in the regular Army.

NIKE training for National Guard units will begin this year. For several years, National Guard units have manned antiaircraft gun installations across the country. The total was 105 batteries during the past year. In the Army's ultimate shift to NIKE-AJAX and NIKE-HERCULES, National Guard units will begin receiving instruction for this assignment.

During the year, reserve duty drill training participation for Army Reserve officers was 86 percent and for enlisted men an average of

71 percent. In the required annual 15 days of active duty training, officer participation was 91 percent and enlisted participation was 89 percent.

In the National Guard, there was an average of 88 percent in armory drills for enlisted men and 94 percent for officers. Participation in field training averaged 95 percent for both officers and enlisted men.

#### *Logistical Support*

In line with the Pentomic requirements, a decision during the year now will permit the issue of three L-19 aircraft to each Army Reserve combat division for training exercises. The L-19 is a 2-seated plane used primarily for observation, liaison, and courier missions.

During 1957, construction starts were made on 66 USAR Centers, 1 separate maintenance shop, and work also was begun to expand 1 facility. Work was completed on 45 USAR Centers and 3 separate maintenance shops, and as of June 30, 1957, construction underway was as follows:

	<i>Number</i>	<i>Estimated cost</i>
Training Centers.....	84	\$24,728,458
Expanding Existing Centers.....	1	148,000
Separate Maintenance Shops.....	1	65,000
<b>TOTAL.....</b>	<b>86</b>	<b>24,941,458</b>

Overall equipment shortages remained, however, and goals during the year were established to provide at least 10 percent of TOE equipment, 90 percent of individual organizational clothing and equipment, and 100 percent of individual clothing and equipment by the end of fiscal year 1958.

The National Guard position in the supply of equipment improved materially, with additional items such as antiaircraft fire control systems, radar sets, armored vehicles, and aircraft being distributed during the year.

In fiscal year 1956 construction was started on 236 new National Guard armory and 43 nonarmory projects. In the past year, 179 armory and 28 nonarmory projects were completed, and new construction started as follows:

	<i>Number</i>	<i>Cost</i>
Armories.....	195	\$26,712,000
Other.....	33	2,300,000
<b>TOTAL.....</b>	<b>228</b>	<b>29,012,000</b>

#### *Reserve Forces Act of 1955*

A total of 117,549 men enlisted in the Army Reserve under all options of the Reserve Forces Act of 1955 during fiscal year 1957. This was a jump of 72,533, or 161 percent, over the 1956 total of 45,016.

A number of changes were made in the program by the Army under authority contained in RFA during the year. The effect of most of the changes is to reduce the time enlistees must serve in the Ready Reserve following their training. The amendments are similar to those made in the National Guard enlistment procedures.

Men between 17 and 18½ now must serve only 3 years in a Ready Reserve status following the completion of 6 months' active duty training. Previously, they were required to serve 7½ years.

High school enlistees between 17 and 18½ now may delay their active duty training for a period of 1 year.

Enlistees between the ages of 18½ and 25 now must serve for 5½ years in the Ready Reserve following 6 months' active duty training. Previous service in the Ready Reserve, up to 2½ years, may be counted against the 5½-year requirement.

These changes went into effect on April 1, 1957.

Meanwhile, the Army had made amendments in Army Reserve regulations other than RFA. The principal change permits men between the ages of 26 and 35 to enlist for 6 months' active duty training and then spend 2½ years in an Ready Reserve unit; but men in this category with scarce military skills need not take the 6 months' active duty, spending instead their entire 3 years as members of Ready Reserve units.

This new regulation went into effect in the second half of fiscal year 1957 and, by June 30, 1957, 23,349 had enlisted under its provisions. This brought the total number of Army Reserve enlistments for the fiscal year to 140,898. Total gains to the USAR Ready Reserve under all programs since the passage of the Reserve Forces Act in August 1955 amount to approximately 185,900. (See fig. 17.)

### Safety

Accident prevention in the Army's worldwide and complex operations again achieved outstanding results. This progress was recognized in June by the presentation of the National Safety Council's Award of Honor for the fourth consecutive year.

Particularly important has been the impact of the program on the governments and industries of foreign nations in which Army operations are conducted. This interest has resulted in new or revitalized national efforts by foreign groups to reduce their accident problems. The Republic of Korea Army adopted the U. S. Army Safety Program in its entirety for military operations. The overall foreign effort should reduce losses in MAP materiel supplied to foreign governments.

Many Army operations in overseas commands, such as military construction, storage and handling of petroleum products, and transport are safely conducted in support of other military Services.

# ARMY

## RESERVE COMPONENTS

### GAINS TO THE ENLISTED USAR READY RESERVE\*

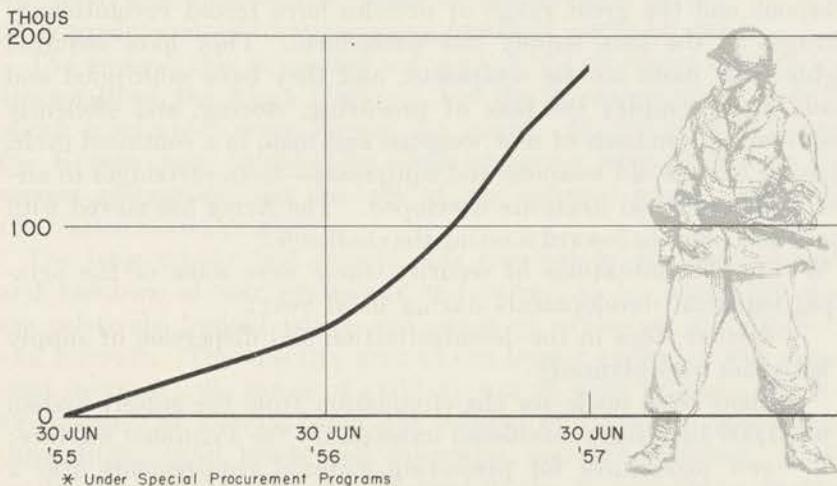


Figure 17.

Typical of accomplishments were these examples:

Only 1 man of each 42 of the military strength worldwide incurred a disabling injury in fiscal year 1957, compared to 1 of each 14 of the labor force of the United States.

The injury rate for civilian personnel reached a new record low of 1 injury each 354,000 hours worked.

The Army operated the world's largest fleet of motor vehicles more than a billion miles, much of it under adverse conditions, with only 1 accident per 65,000 miles, less than 1 accident in driving three times around the world.

## V. Logistics

No element of the Army has felt the impact of modern war requirements more forcefully than logistics. The power of nuclear weapons and the great range of missiles have forced revolutionary changes in the long supply line procedures. They have required lighter and more mobile equipment, and they have multiplied and made more complex the task of procuring, storing, and efficiently distributing hundreds of new weapons and then, in a continual cycle, phasing out the old weapons and equipment—from cartridges to aircraft—as improved items are developed. The Army has moved with speed and purpose toward meeting the challenge.

Within the limitations of security, these were some of the principal logistical developments during fiscal year:

- further steps in the decentralization and dispersion of supply activities were planned;
- plans were made for the elimination from the supply system of 51,000 line items considered unnecessary for Pentomic warfare;
- new procedures for projecting materiel requirements over a 5-year period were developed;
- industrial mobilization plans were reoriented;
- procurement deliveries for approximately \$3.28 billion in materiel were received;
- \$1.7 billion in materiel in excess, foreign excess, and surplus categories were disposed of;
- the Army agencies for Department of Defense-wide supply responsibilities for subsistence, clothing and textiles, and traffic management went into operation;
- construction contracts for \$1,171 million, including \$791 million for the Air Force, were let;
- a civil works program amounting to \$637.5 million was carried out.

### Materiel Distribution

Military units in the past required supply lines and trains stretching for dozens or thousands of miles to rear areas. Over these lines there flowed the continual provision of weapons, equipment, ammunition, food, and medicines to combat troops at the front. The requirement for all items of supply was so heavy that it often controlled the planning of campaigns, and, on occasion, slowed down the advancement of combat units. Exceptions to the rule were paratrooper operations when enough supplies for a short time were air-dropped

with the men, and usually with firm plans for resupplying the units and/or plans for reaching them through an overland assault with reinforcements and additional supplies. During World War II the highly mobile German Afrika Korps, frequently moving too fast for its supply lines, stored limited amounts of items such as gasoline, oil, food, and ammunition—often in subterranean depots—at carefully predetermined locations along proposed routes of attack.

The general rule demanded extraordinary procedures such as the Burma Road, the Alcan Highway, and the thousands of cargo ships which plied every ocean around the world. In World War II and the Korean war, incidentally, these measures were devised in the correct assumption that the bulk of war materiel would come from the United States proper.

The long supply line concept was required by the great weight and numbers of war equipment and permitted by what then was the relatively limited power and range of explosives and artillery and aircraft. The effective area of the largest explosive was measured in yards; the range of artillery was 20 miles at best; and the effectiveness of aircraft often was reduced by relatively short-range capabilities, small bomb load capacities, and bad weather. These conditions put the main supply base in the United States beyond attack and afforded transoceanic and transcontinental supply lanes considerable freedom of operation. Supply roads in combat tactical areas could withstand heavy and sustained bombardments before being disrupted completely and usually it was only a matter of hours before operations were resumed. Materiel could be massed in tremendous quantities at ports and depots behind the combat areas and a modicum of dispersion usually could protect open supply dumps in tactical areas from destruction by air attack.

The advent of missiles and nuclear war has demanded an entirely new concept. The long supply line idea, at least in its previous form, obviously has had to be changed. The heavy massing of materiel at centralized locations overseas would invite destruction with one nuclear missile; and the decentralization of storage facilities within the United States is indicated clearly. Moreover, a full dependency on America's industrial production facilities could be in serious error when missiles attain an intercontinental capability.

Beginning several years ago, the Army launched an intensive effort against these principal facets of the overall problem: Entirely new worldwide procedures of distribution; greatly simplifying, and reducing the weight of, required equipment; cutting to a minimum the number and type of weapons and equipment needed; improving means for the replacement of old equipment with new; and establishing new industrial production concepts.

*Distribution Procedures*

The Pentomic Army will require entire units to move with unprecedented swiftness and over great areas. Together with a heavier demand for air transportation, supply bases must be aligned to provide the particular materiel needed as close as possible to the place and time it is needed.

Small, widely dispersed general depots offer one solution. In the past, Army depots have been big, concentrated, and specialized in one type of equipment. Plans now call for the storage facilities to be reduced in size, widely separated, and each carrying a broad selection in weapons and equipment. The system thus will become more flexible, and essential weapons and equipment will become better dispersed and therefore more immediately available to combat troops. Central supply control agencies and alternates, equipped with electronic data processing equipment, will note the arrival of supplies and their location, and direct shipments. Eventually, the supply complex will be linked by fast communications.

One of the most difficult problems always has been the distribution of repair parts. To help alleviate this problem, the Army Field Stock Control System, which was initiated during fiscal year 1955, has been expanded and will be implemented on a worldwide basis in fiscal year 1958. The system provides for the most essential fast-moving items in forward areas and slow-moving items in the rear. It permits materiel control based on actual demand experience of items rather than past-issue experience. The system has improved the stock records, created selective stockage, and furnished data for developing consumption demand rates. With these improvements, parts stockage has been reduced and, at the same time, supply support and efficiency have improved.

A radically new and different concept of supply to an overseas field Army was the inauguration last year of Project MASS, the Modern Army Supply System, which was an outgrowth of the Army Field Stock Control System. While the test has not run its course, the basic principle of substituting fast service for stockage in forward areas has been proved. The goal of Project MASS is to supply repair parts and maintenance stockage items direct from United States depots to Europe by water in 30 days, as opposed to 120 days formerly required to supply overseas theaters. As a result of this test, stocks authorized in the Seventh Army in Europe have been reduced from 400,000 items to 40,000 items.

One of the techniques utilized in Project MASS is the use of electronic equipment. The development and use of electronic data processing equipment, combined with modern communication systems, has made MASS possible. Automatic and practically instan-

taneous processing of requisitions reduces administrative time and item information exchange to a very few days.

During the year, continued emphasis was directed toward expanding the use of electronic data processing machines at Army installations in the United States. In 1956 these machines were introduced at four central inventory control points. In 1957 they were installed in five additional supply activities.

Another improvement has been the Self-Service Supply Centers. Two of these centers were installed—on a test basis—at Fort Lee, Va., and Fort Lewis, Wash., during 1956. Thirty-seven centers were established during 1957. The centers are comparable to a “supermarket,” through which using units may pick up commonly-used items as needed. Previously, units had to refer to a table of allowances and/or a supply manual from any of seven different technical services in order to determine what they could or could not have. Under the new system, each unit is given a monetary credit representing the maximum dollar value of expendable supplies it may withdraw from the center during a specified period of time. This has resulted in substantial savings in the cost of supplying consumable troop supplies. Units are buying less and are fully utilizing what they buy.

#### *Matériel Programming*

In the past year procedures were developed for projecting matériel requirements over a 5-year period. These procedures include detailed guidance, objectives, and priorities for programing and a format which will result in a phased program for the procurement, introduction, and elimination of items. This marks a major step in matériel programing. The system allows for continued refinements so that eventually it will integrate fully the procurement of major matériel items and all related logistical activities such as: Industrial mobilization, research and development, repair, rebuild and spare parts, storage, distribution, and disposals.

The program entails further illustrations of the shift in emphasis to nuclear and more modern nonnuclear weapons and equipment. A distinct trend has been manifested in the increased procurement of items such as missiles, aircraft, and new electronic equipment and decreases in cannon and older type overland vehicles. Ambulances, semi-trailers, tractors, and trucks—both tactical and commercial types—involving thousands of items and costing initially \$120 million are being eliminated from the supply system. Twelve hundred tanks of the M-46, M-26, and M-24 types, costing initially \$126 million, have been declared obsolete.

Of a total of 658,000 line items on hand, 96,000 were found in excess position and disposal action was initiated. Of those found in

excess position, 51,000 are being eliminated from the Army supply system.

The disposal of obsolescent equipment, plus current fund limitation, creates a deficit in the Army stock fund. This is the inevitable consequence of technological advances and unquestionably is cheaper in the ultimate purpose of properly equipping the American soldier for any type of warfare.

The Army entered the fiscal year with an overall total of \$1.1 billion worth of excess, surplus, and foreign excess personal property on hand, representing about 5 percent of its total inventory. During the fiscal year, \$1.7 billion's worth of property, including scrap, was disposed of either through sales, donations, destruction, or transfers to other agencies. Sales, exclusive of scrap, amounted to \$456 million (based on acquisition cost), for which \$51 million was received, or a return of 11.2 percent. This compares with 7.2 percent in 1955 and 9.3 percent in 1956.

The largest single activity was in the Far East Command where reductions in troop allocations and the transfer of materiel to various Military Assistance Programs, redistributed to other agencies and returned to the United States, resulted in reductions amounting to 867,000 short tons. Additional declarations were made, but the result has been a reduction of their excess and surplus stocks from 967,000 short tons at the beginning of the year to 100,000 short tons at the end of the year. Certain additional troop reductions directed by the President in June will necessitate increased activity in the Far East property disposal program.

A new management procedure requires that decisions pertaining to all material, whether they involve storage, maintenance, utilization, or disposal, will be based upon a predetermined life cycle for the item of materiel. The procedure will be supplemented by standards limiting maintenance expenditures to fixed percentages of replacement costs during the life of the item, and controlling the repair parts and accessories which will be consumed in maintenance. The time periods and maintenance standards will have universal application whether overseas or in the United States, thereby permitting replacement to balance disposal through procurement based on attrition rates for the various classes of equipment to which the system is applied.

Studies carried out during the year revealed that much equipment serving nontactical purposes in the United States was being maintained with the same standards as combat equipment overseas. As a possible means of reducing overall maintenance costs, further studies are determining whether separate maintenance standards can be established. Thus, the costs of maintaining nontactical equip-

ment, such as trucks used for repairs around an Army installation, can be cut back.

### *Cataloging*

The requirement for the armed services to convert to Federal cataloging data exclusively was met by the Army during the year, 4 months ahead of schedule.

The Defense Cataloging and Standardization Act of July 1, 1952, required that every item stocked and used repetitively by the Defense Department would be named, classified, and numbered in a single system of identification. The deadline for the final phase of the program was October 30, 1957. By June 30, 1957, the Army had completed the conversion of technical service nomenclature and stock numbers for all active items of supply, totaling 970,435.

### **Industrial Mobilization**

Because of the advancement in thermonuclear capability throughout the world, adjustments are required in planning for the mobilization production base. In a general war, nuclear attack on the continental United States must be visualized. Although production planning to determine facilities capable of producing items must continue, no firm reliance can be placed on production capability for specific items since potential damage to the industrial mobilization base cannot be predetermined. The Army's capability to fight a general war, therefore, depends at the outset more on stocks in being than on production capability. In a limited (localized) war, on the other hand, or in a period of strained relations, the production base would continue to be of major value in providing stocks of military items to replace those being consumed and in building up reserves for a possible general outbreak. Accordingly, the preparedness effort is now being directed toward reorienting the mobilization base to be responsive not only to a general war but also to a limited war, with production capability geared primarily to the latter.

Current policy provides that the Army, within available funds, will establish and maintain in operation production facilities essential to equip the Active Army and selected reserve forces with newly-developed weapons vital to their mission, taking into consideration the principles of dispersion, protective construction, and underground location of vital facilities. In addition, a portion of the present base will be maintained for the production of existing types of weapons, part of it in operation at minimum sustaining rates and part of it idle but kept in a high state of readiness. The combined operating and idle portions of the base, at their expanded capabilities, will be geared to support a limited war. All other necessary existing facilities and production equipment will be retained in a low state of readiness for

possible use in a general war until such time as the materiel they produce is obsolete or other considerations justify their disposal. All plants and production equipment not essential to meet the latest mobilization production requirements are being declared excess.

#### *Procurement*

Total new procurement placed in the fiscal year involved 1,798,000 actions having a value of \$5.025 billion. This shows an increase when compared with 1,719,000 actions having a value of \$4.428 billion in fiscal year 1956. Total production deliveries during the year amounted to \$3.28 billion, which included deliveries for the Air Force, Navy, Marines, and other customers. Guided missiles, combat vehicles, and electronic and communication equipment accounted for \$1.404 billion of the 1957 fiscal year contract value. Deliveries of hard goods (guns, tanks, guided missiles, etc.) were \$1.820 billion compared with \$2.640 billion for fiscal year 1956. Because of changes in plans and rapid advances in scientific research, many production schedules were revised during the year to phase in newly developed items and engineering changes, or to provide production lead time for complex guided missiles and electronic systems.

Small business firms received as prime contracts approximately 79 percent of the total procurement actions during the year, amounting to \$1.879 billion or 37.4 percent of total contract value. A report from Army prime contractors who have adopted the Department of Defense Subcontracting Small Business Program reveals that small business received approximately an additional \$215 million as first tier subcontractors.

The Army continued its program of holding conferences with procurement personnel throughout the country. In addition, Industrial Panel Conferences were held in seven cities across the country in response to requests from industry groups. Many benefits have resulted from the improved understanding between Government and industry in connection with contracts for military requirements.

The Army continued to review its own commercial- and industrial-type activities to eliminate those involving a product or service which can be provided by private enterprise or which are no longer essential to the performance of the military mission. At the end of fiscal year 1957, a total of 640 reviews had been completed with the recommendation that 129 operations such as automotive repair shops, shoe repair shops, scrap metal baling plants, dry cleaning plants, and bakeries be closed. In addition, a program was initiated for the purpose of reducing procurement administrative overhead costs through consolidation of procurement offices and the resulting reduction of space and personnel. The results of this program, for the most part, will be available during the first half of fiscal year 1958.

## Supply Management Training

Changing concepts of the nuclear age require the training of an increasing number of military and civilian personnel in the management of the logistic organization.

Such training for top-level managers began in the 12-week Army Supply Management Course at Fort Lee, Va., in October 1954. In May 1956, the U. S. Army Logistics Management center was established at Fort Lee. The Army Supply Management Course has continued at the Center and during fiscal year 1957 the following additional functional, middle-level courses were begun:

—The Procurement Management Course to train contracting officers, contract negotiators, and contract administrators;

—The Requirements Management Course to train requirements analysts and supervisors for supply control points, offices of the Chiefs of Technical Services, and for the Army Staff;

—The Storage and Distribution Management Course to teach the management of major depot distribution operations;

—The Maintenance Management Course to train personnel in the management of major depot maintenance operations;

—The Property Disposal Management Course to train personnel responsible for the disposal of excess and surplus property.

In addition, the Logistics Management Center has developed extension courses in supply management for military and civilian personnel of the entire defense establishment.

During the past 2 years, about 1,320 personnel have completed courses at the Center. The expected input for fiscal year 1958 is 1,640.

In addition to training United States personnel, the Center is assisting in the development of supply management training for foreign nationals. In 1956, courses began in Korea and Taiwan, and by September 1957 will be underway in Japan and the Philippines. During 1958, Thailand and six European and Middle Eastern countries are scheduled to receive assistance in developing a national Supply Management Course.

The Logistics Officer Program, implemented in February 1956, gained impetus. At the start of the year, 134 officers of the combat arms and technical services were in the program. The program was opened to field grade officers of all branches of the Service, and by the end of the year 765 officers had been accepted.

Continued progress was made during 1957 in the establishment and implementation of the Logistics Civilian Career Management Program. Ten basic elements essential to the development of Technical Service career fields were developed and issued, and criteria established for evaluation of progress in the establishment of programs by the Technical Services.

# ARMY MILITARY CONSTRUCTION

## VALUE OF CONTRACT AWARDS - FY 57

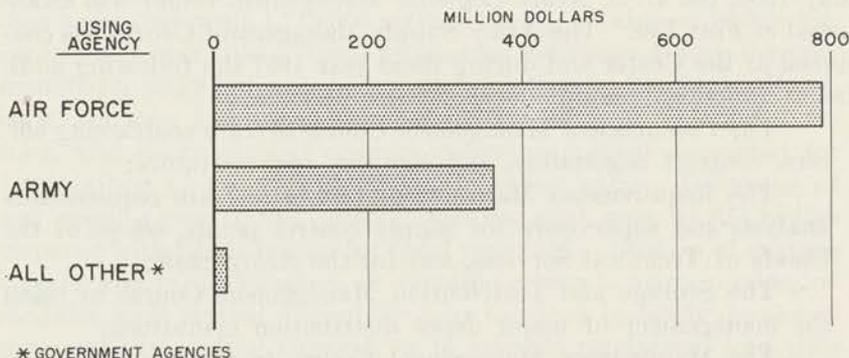


Figure 18.

Fifty separate career field programs have been identified by the Technical Services and are in various stages of operation in one or more Technical Services. This represents an increase of 28 over the 22 fields identified on June 30, 1956. Two are fully operational, 36 are partially operative, and 12 are in the developmental stage.

As a means of replacing engineering personnel being lost to industry, a coordinated college recruitment program was launched in May 1957. The program coordinates the recruiting activities of the different Technical Services across the country through Army control centers in different cities.

### Construction

During fiscal year 1957 the Army awarded contracts for new construction totaling \$1,171 million. This included \$791 million for the Air Force, managed by the Army; \$351 million for the Army itself; \$20 million for the Army Reserve; and approximately \$9 million for other Government agencies. (See fig. 18.)

Work accomplished by the Army during the year, including the completion of many projects, totaled \$1,253,686,000. This included \$765,979,000 for the Air Force, \$418 million for the Army, \$13.3 million for the Army Reserve, and \$56.5 million for other Government agencies and purposes.

Nearly all the work was carried out under the supervision of the Army Corps of Engineers, which also manages the civil works programs.

### *Air Force*

During the past year most of the Air Force construction work, which is performed by the Army under the terms of the National Security Act of 1947, was carried out within the United States, with approximately one-fourth overseas.

It includes family housing projects, radar sites in Canada, an operational test site for BOMARC, and a guided missile training center. One of the largest items is airfield work resulting in part from a step-up in the Strategic Air Command's B-52 program. Many runways are being rebuilt to handle the B-52's. In the past year the Army began work on airfield projects worth \$300 million.

Another significant project is the Connecticut Aircraft Nuclear Engine Laboratory in Middletown, Conn., which the Army expects to complete by January 1, 1958, at a cost of approximately \$43 million.

Work carried out for the Air Force since 1951 totals approximately \$6 billion.

### *Army*

The total of \$418 million in Army construction accomplished during fiscal year 1957 includes \$329.4 million within the United States and \$88.6 million overseas, reflecting an emphasis on permanent facilities in this country and a curtailment of overseas construction programs. Contract awards during fiscal year 1957 also reflect this overall pattern.

In general, projects completed during the year included a large number of NIKE and other tactical facilities, hospitals, and various housing requirements. Work already underway or begun in fiscal year 1957 includes facilities for the Army Ballistic Missile Agency, warehousing, harbors, ammunition loading terminals, laboratories, and the National Military Academy.

### *Barracks Improvement*

Under a program to improve troop housing facilities, initiated in fiscal year 1955, work on approximately 67,000 spaces has been completed. During fiscal year 1957 new work was begun on 47,000 spaces, including 977 barracks, 89 bachelor officers quarters, 6 nurses quarters, and 172 mess halls.

During the past year, work was completed on entirely new barracks for 6,472 enlisted men and 663 officers, exclusive of NIKE housing facilities, and additional work was begun on spaces for 8,472 enlisted men and 180 bachelor officers.

In addition, at the personal request of the Secretary, the commanders of all major installations are encouraging troops to perform minor repair and maintenance tasks on their living quarters. Supplies such as paint, window glass, and door hinges are provided by the Army, and

# ARMY CONSTRUCTION

## CONTRACT AWARDS FOR CONUS FAMILY HOUSING

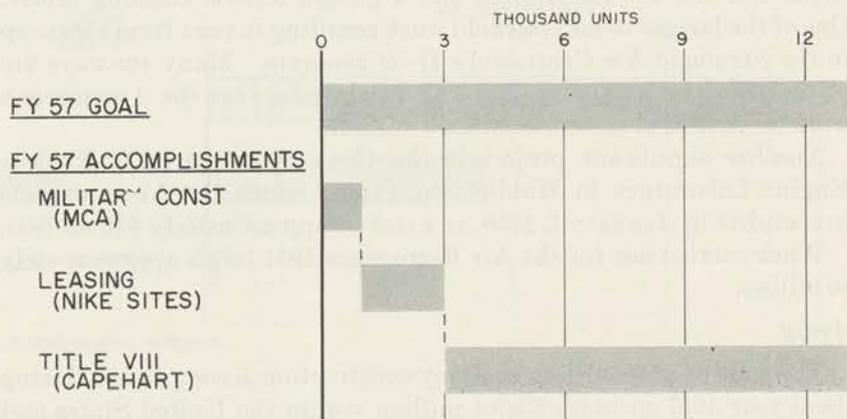


Figure 19.

troops do the work. For the most part, it is maintenance work which, because of funding limitations, could not otherwise be performed.

### *Family Housing*

Despite many problems, 4,739 family housing units were completed during the past year, including those for NIKE installations. The figure comprises 4,361 built with Army construction funds, and 378 under the Surplus Commodity Housing Program, which uses funds from the sale abroad of surplus agricultural commodities.

Also during the past year contracts were awarded for the construction of 14,750 additional housing units. This included 1,004 to be built with Army funds, 2,000 to be leased (for NIKE installations), 436 in Japan and 1,030 in France under the Surplus Commodity Housing Program, and 10,280 under the Capehart Program. (See fig. 19.)

Some relief from the continued problem of obtaining sufficient mortgage money was provided in December 1956 when the Federal National Mortgage Association agreed to purchase Title VIII mortgages at par to the extent of \$200 million for the three military Services. The Army's success in obtaining \$107 million under this plan provided for 7,241 of the 10,280 Capehart units on which contracts were awarded during the past year. Additional relief is expected under Public Law 104 of the 85th Congress which authorizes the Federal National Mortgage Association to purchase an additional \$250 million in mortgages

for the military Services. A total of \$226 million would be available for Capehart mortgages, with the balance for mortgages under Public Law 574, 84th Congress (Housing for Essential Civilian Employees at Research and Development Installations). This will provide approximately 13,000 more family housing units for the three military Services.

#### *Other Construction*

In addition to its own work and that for the Air Force, the Army handles a relatively small number of construction assignments for other Government agencies. An example is the \$34.6 million National Security Agency project at Fort Meade, Md.

Under the Military Assistance Program the Army also is constructing overseas installations which will be turned over to certain foreign nations. A \$60 million project has been underway in Pakistan since 1955 and in April 1957 a \$44 million contract was awarded for work in Iran.

#### **Single Manager System**

Under the Defense Department's Single Manager Commodity Assignment Program in which the Secretary of one military department is assigned as the Single Manager for supply of a certain commodity or service for the armed forces, the Army was assigned responsibility for subsistence, clothing and textiles, and traffic management. Agencies to carry out these responsibilities were established July 1, 1956.

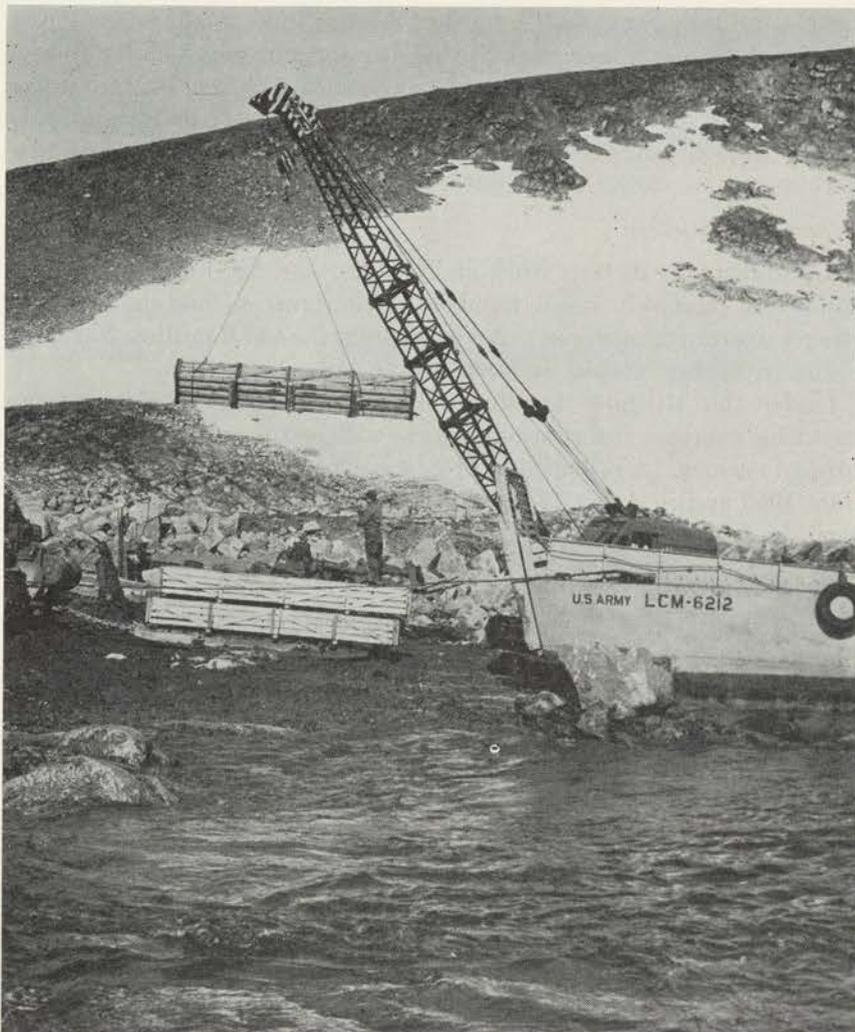
The work progressed satisfactorily during the past year.

The system makes interservice supply virtually automatic, and provides for more effective utilization of transportation and storage facilities. It has resulted in significant economies by eliminating duplicate pipelines, duplicate storage facilities, costly cross- and back-haul of supplies, and concurrent buying and selling.

#### **DEW Line**

The Army's responsibility of supplying DEW line—Distant Early Warning radar stations—in northern Canada and Alaska, was carried out in the fall of 1956, ahead of schedule. Approximately 1,500 Army Transportation Corps troops, operating along a 2,000-mile stretch on the western segment of the line, unloaded 25,000 measurement tons of general cargo and 8,000,000 gallons of bulk petroleum well ahead of the Arctic winter. On the eastern stretch of the line almost an equal amount of general cargo and 2,200,000 gallons of bulk petroleum were off-loaded at the radar sites. (See fig. 20.)

The project is a cooperative program between the Navy and the Army. Navy ships anchor as close as possible to the ice-covered sites



*Figure 20. Supplying DEW line site.*

and Army landing craft and amphibious vehicles run the cargo ashore, sometimes over distances of 12 miles.

### **Civil Works**

The Army's Civil Works Program is an integral part of the Federal plan for developing the Nation's water resources to meet the increasing needs of an expanding population.

The program includes over 3,000 projects in the 48 States, the District of Columbia, and the Territories and possessions. The work embraces projects for the improvement of the Nation's rivers and harbors for navigation, flood control, hydropower, and related purposes.

The Congress specifies the areas to be investigated, prescribes the policies to be followed, defines the limits of Federal participation, and assigns responsibility for construction and administration to the Secretary of the Army and the Chief of Engineers.

For fiscal year 1957, funds appropriated to the Corps of Engineers for Civil Works amounted to \$637.5 million. They are broken down as follows:

Construction:		
Planning .....	9.5	
Construction .....	448.9	458.4
Operation and maintenance:		
General .....		95.9
Mississippi River and tributaries:		
Construction .....	47.0	
Maintenance .....	15.8	62.8
General expense .....		10.4
General investigations .....		9.3
Niagara remedial work .....		.5
St. Lawrence Joint Board .....		.2
<b>TOTAL .....</b>		<b>637.5</b>

Of the 223 projects for which funds were provided for 1957, 119 were new starts or resumptions, including new starts on 3 units of the Mississippi River and Tributaries project. Of the 121 continuing projects, 52 were completed or essentially completed during the year, and 24 of the 98 planning projects reached the point where construction could be initiated. As of June 30, 1957, maintenance operations were carried out on 221 waterway and harbor projects to meet the requirements of over a billion tons of shipping. Also, 105 flood control reservoirs were in operation, having a storage capacity of some 20,000,000 acre-feet for impounding flood waters. The backlog of maintenance work, which had accumulated over many years, was reduced by the amount of \$10 million specifically appropriated for this purpose.

Operations of particular note include the completion of the United States portion of the remedial works at Niagara Falls constructed jointly with Canada for water diversion to increase power and preserve the scenic beauty of the falls and river. The Corps of Engineers, as agent of the St. Lawrence Seaway Development Corporation, also continued construction of the United States portion of the Seaway project, which is about 45 percent complete. Progress has been made on the construction of the Dwight D. Eisenhower Lock and the Grass River Lock as well as the excavation of the Long Sault Canal, which will bypass the International Rapids Section of the St. Lawrence River.

A study by the International Joint Commission to determine the cost and economic feasibility of utilizing the tides of Passamaquoddy Bay for the generation of electric power, as authorized by Public Law 401, 84th Congress, was started in August 1956 and is scheduled for completion in 3 years. The engineering aspects of the study are being carried out by an Engineering Board established by the Commission, the Corps of Engineers providing the engineering services for the United States Section of the Board. The sum of \$1,344,000 was made available to the Commission by Public Law 85-49, 85th Congress, for the continuation of this study during fiscal year 1958.

The following dams or construction features of the projects were placed in effective operation during fiscal year 1957:

Buford Dam.....	Chattahoochee River, Buford, Ga.
Jim Woodruff Lock and Dam.....	Apalachicola River, Chattahoochee, Fla.
Old Hickory Lock and Dam.....	Cumberland River, Hickory, Tenn.
Texarkana Dam and Reservoir.....	Sulphur River, Texarkana, Tex.

Although the primary purpose of the civil works program is to aid navigation and flood control, the public derives additional benefits from the hydroelectric power produced at 29 multiple-purpose projects located in 19 states across the Nation. Installed capacity at these projects increased to 4,824,400 kilowatts during the fiscal year. This was an increase of 799,000 kilowatts over fiscal year 1956.

The total recreational attendance during the calendar year 1956 at all reporting civil works projects was 71 million. The waters of these projects are accessible to the public at 2,800 points, and water craft operating on the reservoirs increased to over 75,000. Organized youth camps on reservoir lands now have a 30,000-camper capacity.

Work accomplished at the request of Federal Civil Defense Administration pursuant to the Disaster Act of 1950 consisted of the following: Completion of the \$34 million Operation NOAH program in the northeastern states, undertaken following the disastrous floods of August and October 1955; initiation of and substantial progress on a \$1.6 million program of clearing hurricane-choked stream channels in North Carolina; completion of a \$2.8 million program, mainly flood debris channel clearance, resulting from floods of December 1955 and January 1956 in California and Nevada; and the repair or replacement of about 200 pedestrian and vehicular bridges in Kentucky following the floods of January-February 1957.

The Northeast flood studies, authorized by the Senate Committee on Public Works in 1955, were continued and are providing valuable data for the current river basin studies such as the Potomac, Delaware, Passaic, and others. Hurricane studies under Public Law 71,

83d Congress, are being made to develop basic knowledge and also justifiable protective works. Two completed reports favorable to such projects in the New England area will be transmitted to Congress in the near future after completion of review by other Federal agencies and the Bureau of the Budget.

### **Operation MERCY**

From November 21, 1956, until June 30, 1957, the Army operated the Joyce Kilmer Refugee Center at Camp Kilmer, N. J., feeding, housing, and caring for 32,000 Hungarian refugees pending their settlement in the United States.

Circumstances permitted the Army an advanced notice of only 11 days in which to open the center and prepare bedding, food, and medical facilities for the first group of refugees. Only 5,000 Hungarians were expected initially. The number continued to grow, and the Army also provided office space and utilities for 22 other agencies assisting the refugees.

By the end of December 1956 the number of refugees had risen to 15,140 and approximately another 16,000 were processed by the end of the fiscal year.

Cost to the Army, exclusive of pay for the 3,500 military personnel involved, was \$6.2 million.

### **Texas City Claims**

Authority and responsibility for the settlement of claims arising from the explosions and fires at Texas City, Tex., on April 16 and 17, 1947, were delegated to the Chief, Claims Division, Office of the Judge Advocate General, and Judge Advocate officers assigned to that division.

During fiscal year 1956, a field office of the Claims Division and a supporting medical detachment of the Office of The Surgeon General were established at Galveston, Tex., for the receipt and investigation of claims. The Claims Division was augmented by personnel necessary to staff the Texas City Claims Branch which was established; claims were received, investigations were initiated, and some of the claims were settled.

During fiscal year 1957, the program was successfully completed. A total of 1,715 claims, aggregating \$65,903,649.66, were received, of which 1,394 (367 in fiscal year 1956) were approved for an aggregate of \$16,546,152.54. All awards were determined and fixed before February 8, 1957. Some 21 claims remain unpaid because the claimants have not submitted the requisite Settlement Agreement and Assignment, and 321 claims (120 filed too late) aggregating \$4,993,906.44, on which awards could not be made, will be reported to the Congress pursuant to the act.

## VI. Management

In meeting the consistent requirement for more efficient management, particularly in view of rising costs, the Army during the past year again achieved significant work-saving and dollar-saving improvements in management, thus aiding those activities which support the combat effectiveness of our forces. Achievements include:

- outstanding progress toward a cost-of-performance budget;
- specialized management training for 1,800 officers and key civilians;
- benefits amounting to approximately \$85 million as the result of specific management advancements;
- installation of 6 new automatic data processing systems; and
- training of almost 12,000 supervisors in work simplification.

### Cost-Based Budget

In accordance with the National Security Act Amendments of 1949, which call for a reorganization of fiscal management in the military establishment to promote economy and efficiency, one goal of Army management has been a "cost-based" or "cost-of-performance" budgeting system which determines and expresses the costs of Army activities and operations as well as the costs of payroll and materiel. Thus the Army can better explain and justify its requests for money, and the Congress can appropriate funds in terms of Army functions.

Despite the delays resulting from the Korean war, the Army has given an immeasurable number of man-hours and hundreds of studies, surveys, and tests to the effort of developing the new techniques. Progress in the past 12 months has brought the Army much closer to the ideal objective of a cost-of-performance budget. It is anticipated that, for certain appropriations, the Army will be able to give the Congress its fiscal year 1960 requirements on a cost-of-performance basis.

The several years' work toward this end, in accordance with the law, necessarily has gone beyond the pursuit of a cost-of-performance budget solely. It has required, and resulted in, the development of numerous systems improving all the Army's management processes; certain new procedures serve not only financial needs but are highly efficient instruments of management as well.

#### *Command Management System*

The most significant accomplishment toward the cost-of-performance budget during the past year was the extension throughout all

Army areas of the United States of the Army Command Management System (ACMS).

ACMS integrates into one overall system the processes of programming Army activities, budgeting, accounting, performance analysis, and manpower control. It provides a simplified method of fund control and a means of controlling operations in terms of performance cost. The system therefore is a major management tool of command at nearly all levels.

During fiscal year 1957, the establishment of ACMS in nearly all Army installations in the United States, Hawaii, and Alaska had the effect of tightening management and accounting procedures in several hundred installations, including training centers, depots, laboratories, personnel processing centers, supply agencies, hospitals, and production facilities. Pilot operations were installed in the Army's commands in Europe and Japan.

The two main elements of Army management supporting ACMS and integrated by ACMS are the Program System and the Financial Management Plan, which were improved during the year.

The Program System is a management device by which the Army plans its work, controls its activities, and then reviews and analyzes progress to determine if the goals planned have been met. Important for cost-based budget purposes, the system provides a projection of workloads and costs on a continuing basis in the fiscal cycle. For several years the Army has employed 16 Primary Programs. During the past year the System was revised. It now provides for five Control Programs which constitute a 5-way division of the peacetime missions of the Army and over a period of 5 years. These five Control Programs thus constitute a base from which guidance is derived by the Army's field activities, with the dominant feature being that field operations will be based directly on appropriations as they appear in the Army budget—a principal requirement of the cost-of-performance budget. They will become fully effective in fiscal year 1959.

The Financial Management Plan has established the various financial and accounting controls prerequisite to a cost-of-performance budget. Its principal components are: Appropriation and Revenue Accounting; Financial Property Accounting; Integrated Accounting; Stock Funds; Industrial Funds; Consumer Funding; and Internal Audit. More than 400 comptroller offices have been set up in the Army since the program started, and 267 finance and accounting offices have been established to feed reports to 22 headquarters offices which then report to the Department of the Army. The latter was accomplished under Integrated Accounting, work on which was completed during the past year.

Also during fiscal year 1957, the total number of Army activities brought under the industrial fund—a system of working capital or revolving funds—rose to 22 when the Army Pictorial Center and the Aberdeen Proving Grounds were added.

#### *Management Structure*

In addition to the Program System and the Financial Management Plan, a third integral part of ACMS is the Army Management Structure. It provides a single uniform classification of the Army's non-tactical activities and thus is the framework around which ACMS functions toward the cost-based budget. One aspect of the Structure which helps to effect this is a uniform listing of activities with standard terminology, definitions, and activity interrelationships and another is its means of directly relating manpower and financial resources to scheduled and accomplished workloads. Thus, overall measurement and control factors run with clearer identification from the appropriation step by Congress through the accounting machinery of different Army commands to action in the field; and inversely, field activities—based directly on appropriations—are reflected back for the type of budget presentation Congress wishes.

#### *Appropriation Structure*

Necessary to this end are changes in the structure of the annual appropriations which are subdivided into nine categories, including Military Personnel, Operation and Maintenance, Procurement and Production, Research and Development, National Guard, Reserve Personnel, Military Construction for Reserve Forces, Military Construction for the active Army, and Other Appropriations. These, in turn, are broken down into more specific major activities such as Tactical Forces, Training Activities, Army Reserve and ROTC, etc. To realign the overall appropriation structure toward the cost budget, the Army is making Congress-approved revisions. During the past year, for example, the number of subdivisions within Operation and Maintenance appropriation was reduced from 16 to 12 for fiscal year 1957 and a further reduction was made to 8 for fiscal year 1958.

### **Overall Management Improvement**

#### *Management Training*

Changes in recent years in the Army's programing and management systems have intensified the need for management training of Army personnel, both military and civilian. This need was foreseen, and numerous management training courses are conducted regularly.

Last year, instruction in Army management of various types and degree was given to an overall total of 12,000 officers in various Army-

wide schools and courses. The amount of instruction ranged, according to the level of the students and the type of the schools, from a few hours to 150 hours.

Included in this overall figure were 1,800 officers and key civilians who attended specialized management courses at the Command Management School, the Finance School, and the Comptrollership Course at Syracuse University.

The Command Management School, at Fort Belvoir, Va., provided a 3-week course in management instruction for 514 higher-level civilian and military personnel during fiscal year 1957.

Comptrollership and Financial Management Courses, provided by the Finance School at Fort Benjamin Harrison, Ind., to fill special training needs, were taken by 1,255 officers and civilians in fiscal year 1957. The courses given were:

- Military Comptrollership Course (6 weeks);
- Budget Course (5 weeks);
- Review and Analysis Course (3 weeks);
- Financial Inventory Accounting and Stock Fund Course (3 weeks);
- Integrated Accounting Course (5 weeks);
- Introduction to Accounting I (extension course); and
- Introduction to Accounting II (extension course).

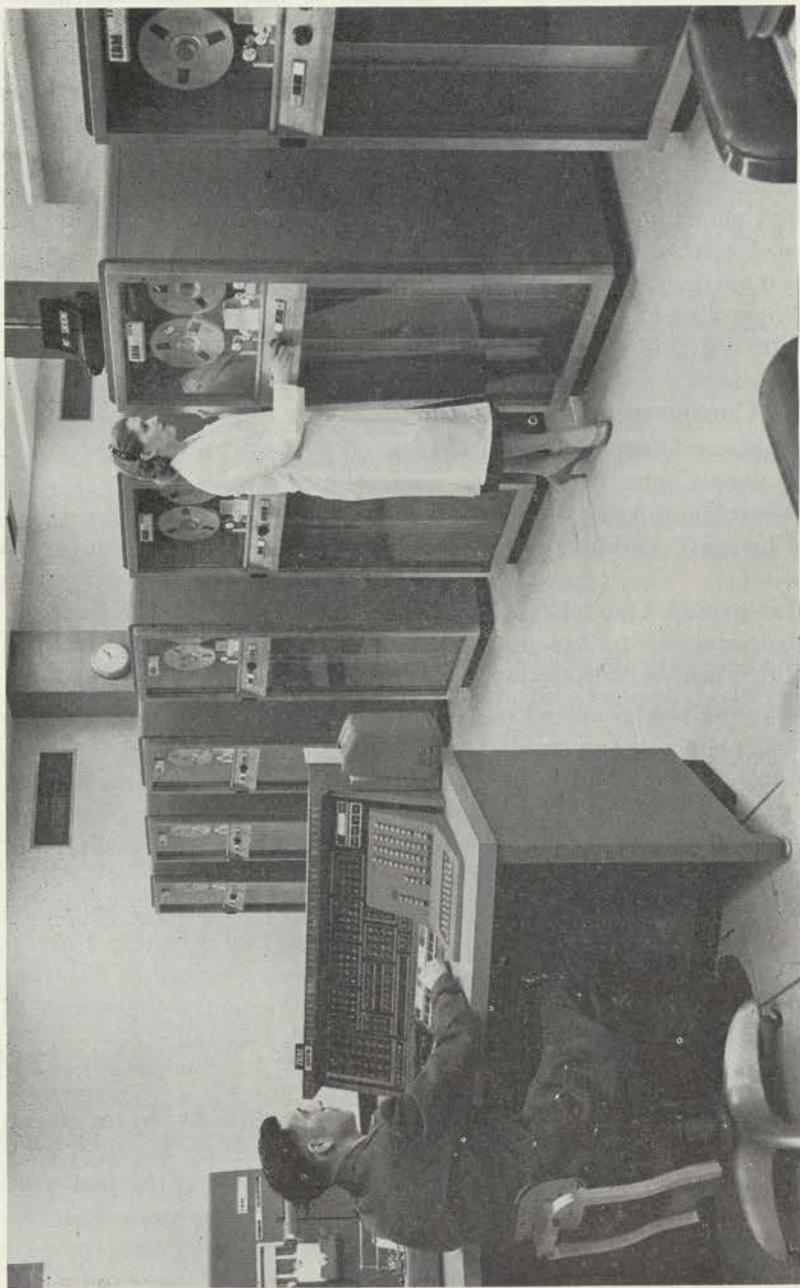
Next year the school will offer four more extension courses in accounting, namely, Intermediate Accounting, Auditing, and Cost Accounting. Arrangements have also been completed for presentation of four residence courses in accounting: Basic Accounting (4 weeks), Intermediate Accounting (4 weeks), Cost Accounting (4 weeks), and Advanced Accounting (5 weeks).

Thirty-one selected officers graduated from the regularly scheduled 14-month Army Comptrollership Course offered by Syracuse University, N. Y., during the year, receiving Master's Degrees in Business Administration. Army officers attend management courses also at Harvard University and the University of Pittsburgh.

#### *Management Benefits*

In view of the costs necessary to compile worldwide figures on the number of management improvements and resulting benefits, only examples of such improvements are collected. During the past year 1,050 examples were compiled, with benefits totaling more than \$85 million.

Under the Management Improvement Program, commanders of nontactical units are required to develop and implement, wherever practicable, procedures to increase production, reduce paperwork, cut costs, save man-hours and materiel, and to make certain that all per-



*Figure 21. Army personnel operating automatic data processing system.*

sonnel—military and civilian—realize their constant responsibilities to improve working methods and output.

Hundreds of improvements are developed and installed every quarter, ranging in benefits from a few hundred dollars to many million dollars. These new techniques and methods are distributed to all Army commands around the world. Ultimate benefits therefore are many times the original dollar-value estimate. These benefits are of vital assistance to the Army in carrying out with maximum effectiveness its assigned missions in the face of constantly increasing costs.

Selected examples of management improvements during the past year are described below:

The Detroit Ordnance District determined a means for revising its shipping order procedures for wheeled vehicles, resulting in reduction of \$500,000 in transportation costs from November 1956 through February 1957. Benefits will be substantially increased when the new procedure is adopted on a nationwide basis.

By substituting terrace gravels for fine grained soils as central core and filters at Lookout Point and Dexter Dams, the Corps of Engineers reduced the cost by \$2,875,000 as compared to the cost of the previously planned method.

By setting up packing operations on a production line for oversea shipment of subsistence items, the Auburn General Depot has estimated that benefits of \$34,178 will accrue.

By redesigning the conveyor line system used for the packing and crating of cargo for oversea shipment, the Brooklyn Army Terminal has estimated a reduction in costs of approximately \$220,000 for the first year.

Due to the installation of a Quality Assurance Program which controls the desired quality of performance of any activity and reduces the number of rejected items, the Tobyhanna Signal Depot has estimated that an annual benefit of \$7,550 will be realized.

A new method of packaging dies, jigs, fixtures, and equipment held for industrial reserve was developed by the U. S. Army Chemical Arsenal, Rocky Mountain, Colo., with an estimated annual benefit of \$2,000.

#### *Work Simplification*

During fiscal year 1957 a total of 11,951 supervisors were trained in work simplification, and installed improvements totaled 7,865 with benefits amounting to \$9,031,203.

To the end of helping them improve their efficiency, many thousands of Army supervisors are trained every year in analytical tools of management, such as work distribution charts, flow process charts, layout studies, and motion economy. With these techniques, super-

visors analyze their work and seek reductions in lost motion, the elimination of duplication, and the streamlining of paper work.

Over the past 5 years, on the average, 19,089 supervisors have been trained annually, with an average of 10,292 improvements installed every year. The average annual value of these improvements has been \$11,282,040.

#### *Automatic Data Processing*

Six additional automatic data processing systems (fig. 21) were installed during the year, bringing the total to 10. Nine are in supply accounting operations and 1 is in personnel accounting. Studies for additional uses of ADP systems were completed during the year, and during fiscal year 1958 new installations will include traffic management, financial accounting, and an integrated supply and financial accounting operation in one command overseas. In addition, the Project MASS (Modern Army Supply System) will be streamlined with ADP system.

In recognition of the need for training in the highly specialized technical field of computer installation and operation the Army plans to introduce ADPS courses in the Army Service Schools shortly.

## VII. Budget and Funds

Direct obligations for Army missions for fiscal year 1957 of \$9,758 million were \$100 million above fiscal year 1956. Obligations planned for fiscal year 1958 are expected to be \$218 million less than fiscal year 1957, or approximately \$9,540 million.

Cost shifts are apparent in different Army activities. The cost of operating and maintaining the Army establishment went up \$156 million from 1955 to 1956; up \$223 million from 1956 to 1957; and it is expected to be up \$82 million from 1957 to 1958. Reasons include continuous increases in materiel costs as indicated by the wholesale commodity index; increased wage and transportation rates; the requirements of new legislation, such as the Dependent's Medical Care Bill; the expanded capitalization of inventories under the Army stock fund and the requirement to pay for them out of Operations and Maintenance appropriation funds as they are consumed; and civil service retirement contributions.

Other cost shifts are apparent in the procurement of heavy goods, which is declining, in the amount of \$424 million in 1956 as compared to 1955; down \$98 million in 1957 as compared to 1956; and down an estimated \$222 million in 1958 over 1957.

Because of personnel reductions, the costs of the Active Army also are declining, while the costs of the reserve components are rising. (See fig. 22.)

### Obligational Authority and Obligations

Funds available to the Army in the Military Functions accounts for fiscal year 1957 totaled \$12,490 million. Of this amount, \$10,509 million was authorized for obligation, both for direct mission costs of the Army and for services to other military and civil agencies through reimbursable agreements. The balance of the available funds, consisting mostly of Procurement and Production and Military Construction funds, was ear-marked for use in fiscal year 1958 and future periods.

Unobligated balances of funds available for carryover were reduced to \$1,883 million in 1957 from \$2,891 million reported at the end of fiscal year 1956. The major factor in this reduction was the financing of the Procurement and Production Program from these balances. No funds have been appropriated to this account since fiscal year 1954. However, during 1958 this balance will be consumed

	(In Millions of Dollars)			
	1955	1956 Actual	1957	1958 Estimate
● MILITARY PERSONNEL	4,241	3,645	3,595	3,468
● OPERATION & MAINTENANCE	2,656	2,812	3,035	3,117
● PROCUREMENT & PRODUCTION	2,318	1,894	1,796	1,574
● RESEARCH & DEVELOPMENT	336	404	427	457
● RESERVE PERSONNEL	84	125	179	203
● ARMY NATIONAL GUARD	219	271	306	327
● MILITARY CONSTRUCTION, ARMY RESERVE FORCES	23	43	51	27
● MILITARY CONSTRUCTION, ARMY	390	447	344	340
● OTHER GENERAL & SPECIAL ACCOUNTS	29	16	25	27
TOTAL	10,296	9,658	9,758	9,540

Figure 22.

and new funds for this appropriation will be required by direct action of the Congress for fiscal year 1959.

### Expenditures and Unliquidated Obligations

During fiscal year 1957, the Army had a net cash outlay of \$9,063 million, excluding the Army's portion of Military Assistance Program funds. This is approximately \$360 million higher than fiscal year 1956. Expenditures for fiscal year 1958 are estimated to be \$9,043 million. The increases since fiscal year 1956 are due to several causes: (1) Depletion of large inventories built up during the Korean conflict; (2) the continual rise in costs; (3) increased activities in the reserve components; and (4) mandatory increases, such as new legislation. (See fig. 23.)

Unliquidated obligations at the end of fiscal year 1957 were reduced to \$4,273 million, as compared to \$4,763 million at the end of fiscal year 1956. Balances at the end of fiscal year 1958 are expected to be smaller than at the end of fiscal year 1957. Considering the size of the Army programs, this amount is at about the minimum yearly carryover. Most of it is outstanding with contractors who are furnishing weapons, combat vehicles, research, and construction.

# ARMY EXPENDITURES

## NET EXPENDITURES FOR MILITARY FUNCTIONS

(In Billions of Dollars)

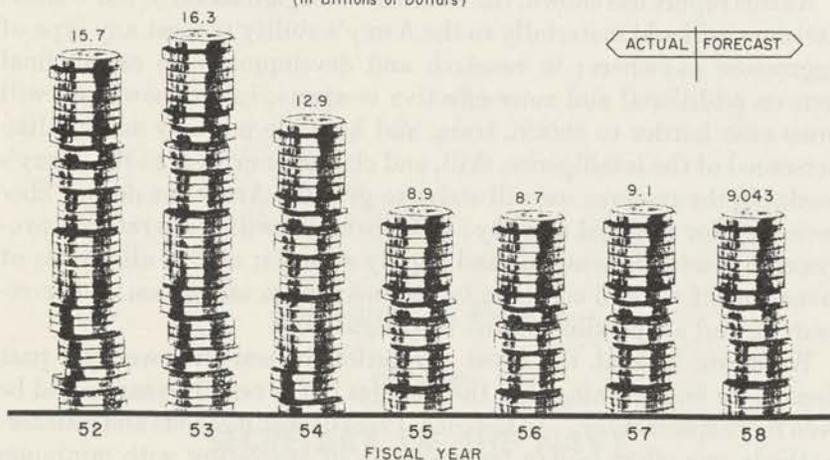


Figure 23.

### Fiscal Year 1958

The budget for 1958 provides for total obligations at a level of \$10,511 million compared to \$10,509 million for fiscal year 1957. Funds are provided through the following sources:

	Millions of dollars	
	1957	1958
New appropriations	7,646	7,694
Transfers from other accounts	228	400
Use of carryover balances	2,891	1,883
Recovery of prior year obligations, P & P	215	100
Reimbursements	1,510	1,315
<b>Total available</b>	<b>12,490</b>	<b>11,392</b>
Less balances carried forward	-1,883	-737
Less balances reverting to Treasury	-98	-144
<b>Obligations incurred</b>	<b>10,509</b>	<b>10,511</b>

## VIII. Conclusion

During the forthcoming fiscal year 1958 we expect accomplishments even more significant than those of the past 12 months.

As this report has shown, the Pentomic reorganization of our combat divisions will add materially to the Army's ability to meet any type of aggression anywhere; in research and development we expect final tests on additional and more effective weapons; in manpower we will press even harder to obtain, train, and hold the military and civilian personnel of the intelligence, skill, and character critical to the Army's needs; in the reserves we will strive to give the Army the deeper fiber necessary for national security; in logistics we will accelerate the program to Pentomic weapons and supply systems; and in all phases of management we will continue to seek maximum utilization of our resources, and all possible means to reduce costs.

When we look at the great revolution in warfare over the past decade, we find warning that the changes in the next 10 years could be even more spectacular. In the global race of war methods and counter-methods, our effort cannot be one solely of answering with minimum adequacy the current demands of national safety. We in the Army are looking years ahead, anticipating our needs and planning for them.

The success of the Army in preparing for the challenges of the nuclear and missile era—climaxed in the Pentomic concept—demonstrates the great stature of the Army in America's defense and signifies the Army's expanding potential for the future. The maximum exercise of this potential is obviously essential to America's security.

By providing the means, in funds and manpower, for this effort, the people of the United States will receive an even richer return from their Army investment in greater war-deterrence and in greater certainty of victory if we are attacked.

*Wilber M. Brucker.*

WILBER M. BRUCKER,  
*Secretary of the Army*

## I. Introduction

It is a pleasure to present to you the Semiannual Report of the Secretary of the Navy for the period from January 1, 1957, to June 30, 1957.

The report contains an account of the work of the Secretary of the Navy during the period from January 1, 1957, to June 30, 1957, and the work of the Department of the Navy during the same period.

The report is divided into two parts. The first part, which is the main body of the report, contains an account of the work of the Secretary of the Navy during the period from January 1, 1957, to June 30, 1957, and the work of the Department of the Navy during the same period. The second part, which is the appendix, contains an account of the work of the Secretary of the Navy during the period from July 1, 1957, to December 31, 1957, and the work of the Department of the Navy during the same period.

# **Semiannual Report of the SECRETARY OF THE NAVY**

**January 1, 1957, to June 30, 1957**

## VIII. Conclusion

During the last few years there has been a rapid development in the various branches of the naval service, and it is the purpose of this book to present a summary of the progress made in each of these branches.

In the report presented to the President in 1917, it was stated that the United States Navy was the largest in the world, and that it was the most powerful. This was due to the fact that the United States had the largest fleet of ships, and the most powerful fleet of submarines.

The United States Navy has been the most powerful in the world for many years, and it is the purpose of this book to present a summary of the progress made in each of these branches.

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## I. Introduction

It is 159 years since Benjamin Stoddert submitted the first report of the Secretary of the Navy.

Since that time, annual reports of the Secretary of the Navy have mirrored the capabilities, the achievements, the problems, and the readiness of the Department of the Navy.

While the order of magnitude and technological span of the affairs of the Department have increased enormously, I believe Secretary Stoddert could readily grasp the problems of today's Naval Establishment because the relationship of the Navy to the Nation, and to the oceans which surround us, remains and will remain unchanged.

The United States is a maritime power. In the strategic sense, it is, like Britain in Napoleonic days, an island power, facing an enormous unfriendly land power which is attempting to break out into the sea areas where lie our highways and defenses.

In 1798, my predecessor reported the creation, only a few months earlier, of a separate Department of the Navy. Before then, our Navy and Marines had been combined with the single military establishment of the day, under the one military department. The rebirth of the Naval Establishment resulted directly from national realization that the safety of the United States, as well as the successful prosecution of its foreign policies, demanded then, as now, a strong Navy.

This report will provide insight into our needs and plans. It will show what we can do now, and what we hope to be able to do. This is an account of stewardship: Of what we received, how we spent it, and what we would like to have.

In addition, however, to the facts which have been compiled, this report attempts to voice a philosophy for the role of American seapower. We are being pressed harder now, by more relentless competitors, than ever in our history. The challenges are great. I am confident that the Navy and the Marine Corps can meet them.

## *II. The Challenge to American Seapower*

Ten years ago the naval supremacy of the United States was undisputed and unchallenged. This is no longer true. Soviet Russia is making her bid for world domination in all phases of national effort. Her campaign has been ably contrived and is spread in many directions. Diplomatic pressures, infiltrations, threats, and warlike acts are all coordinated to achieve the ends of communism. Each widely separated thrust provides the diversion and camouflage for the next.

### **The Naval Challenge**

Since 1950:

Russia has outstripped us 6 to 1 in tonnage of submarines built.

Russia has outstripped us 9 to 1 in tonnage of destroyers built.

Russia has outstripped us 14 to 1 in tonnage of cruisers built.

Russia has commenced to develop an effective modern organization not unlike the Marine Corps.

Of course, we are not in a shipbuilding race with the Soviets. The significance of these figures is that they clearly demonstrate the vital importance which Russia attaches to offensive naval power and to maintaining its already achieved status as a first-rate sea power. Russian progress has extended to all areas vitally affecting naval operations, the tactics that prepare a navy for war, the deployment that gives a navy its mobility, the construction program that provides a navy with its striking power, and the technical developments that keep a navy on equal footing with rival powers.

There are, to be sure, indications that submarines are now being built at a slower rate than in the past year. However, the submarine fleet as a whole continues to improve rapidly in quality and offensive power, since ever-growing numbers of boats are modern, new types. Well over half the Russian submarine force today is less than 5 years old.

We believe that the Soviets are now engaged in shifting from conventional to advanced types of weapons systems. While these new systems are in process of development, major surface warship and submarine construction is temporarily diminished, freeing the yards for the construction of vitally needed merchant types and the mass production of smaller naval vessels, particularly tankers and submarine tenders. This is contributing to a sharp growth in the mobile logistics capabilities of the Soviet Navy.

A new and growing factor on the international scene is the use of Soviet maritime power for politico-economic purposes. The Soviet

Navy is "showing the flag" on an increased scale in critical areas of the world. This year, probably because of the universal revulsion toward Soviet actions in Hungary, they made naval visits to only three countries, but on the other hand we have seen a new high in the movement of Soviet warships on the high seas outside their own home waters. The unusually high level of activity of Soviet warships in the Mediterranean this year was undoubtedly aimed at influencing the situation in the Middle East. The delivery of naval craft to Egypt and Syria and the Soviet naval visit to Syria are integral parts of their continuing efforts to extend their influence in the Middle East.

Recent activities of Soviet merchant ships indicate that the U. S. S. R. has initiated new roles for its merchant marine. They are commencing to charter ships to Western firms. This employment is not only profitable from a commerce, training, and intelligence standpoint, but it also serves to further the political and economic aims of the Soviets.

In contrast to their increasing exploitation of the "freedom of the seas" the Soviets have continued their defiance of other maritime powers of the world by closing further areas of the high seas to Western fishing and other peaceful oceanic pursuits.

The increasing Soviet use of the oceans as a cold war battleground is simply another tactic in furtherance of the announced Communist objective of ultimate world domination.

The Soviet Navy's main threat to the free world continues to be its powerful submarine force. The new weapons systems under development by the Soviet Navy are likely to appear first in the submarine fleet. The Soviets could now have guided missile submarines and may be building nuclear-powered submarines. Certainly they will have them, and in growing numbers, in the years to come. Such developments will give the Soviet Navy not only the capability seriously to threaten our sea communications but also a strategic offensive capability to launch nuclear missile attacks against continental United States and our oversea bases.

The full emergence of the Soviet Navy as a tempered, balanced fighting force allows no grounds for complacency. The challenge which it poses is serious today and will be truly formidable in the future.

### **The National Challenge**

In his speech to the nation on November 13, 1957, the President outlined four tasks which the military Services had to perform: "(1) As a primary deterrent to war, maintain a nuclear retaliatory power of such capacity as to convince the Soviets that any attack on us and

our Allies would result, regardless of damage to us, in their own nation's destruction. (2) In cooperation with our Allies, provide a force structure so flexible that it can cope quickly with any form of aggression against the free world. (3) Keep our home defense in a high state of efficiency. (4) Have the reserve strength to meet unforeseen emergency demands."

We must clearly, therefore, be prepared for positive retaliation; to fight a general war; to contain limited aggression with military force; and also retain sufficient flexibility to cope with any other type of emergency which might arise.

Our nuclear retaliatory capability has been effective up to now. The Soviets must feel that we still possess the military capacity to demolish their country, even conceding to them the initiative in starting a nuclear war. This acknowledged nuclear stalemate, then, must still be a dominant consideration in our military thinking.

After providing effective retaliatory systems, we must—and equally important, as the President has stated—retain our capability for *all* types of war. Even though we maintain the nuclear stalemate, we could lose a limited war or a cold war if too much effort is devoted to over-concentration on all-out war.

The Communist philosophy has world domination as its goal. This means that there must be a world left to dominate. A nuclear holocaust, participated in by the United States and Soviet Russia today, would only devastate both participants. This type of suicide pact with the enemy is not what the Soviet leaders have in mind because it would not serve the Communist cause.

Therefore, it is mandatory that we orient our military thinking to existence within a nuclear stalemate. We must be prepared to deploy forces, in suitable strength, to trouble spots anywhere in the world. We must be able to back our diplomacy with a demonstrated capability of enforcement on the spot. We must be able to contain minor aggressions immediately and with an amount of force just sufficient to do the job without destroying the area or spreading the trouble.

To win the twentieth century race for survival, the United States needs both the ability, through invulnerable deterrent striking power, to keep general war hypothetical and the equal ability to cope effectively and swiftly with an infinite number of very real limited aggressions and politico-military probings designed to expose and exploit the slightest local weakness. Our Navy and Marine Corps contribute effectively to meeting both of these national requirements.

### III. Naval Operations

#### Concept

Oceans cover 70 percent of the surface of the earth. Upon, under, and over these great waters, the United States conducts its foreign commerce, prosecutes its foreign policy, and when forced to do so, wages its wars. These high seas are open to our use without the limitations which apply to shore bases in allied or foreign territory.

It is the mission of the United States Navy and Marine Corps to secure these oceans (and thus the Americas) in time of peace, and to control and exploit control of the seas in times of war or world tension.

To perform its role as a precision instrument of the foreign policy of the United States, the Fleet, as well as the establishment which supports it, must be ready, flexible, versatile, and strong.

In meeting these fundamental requirements during the past year, United States naval power has continued to respond to the impetus of new weapons and revolutionary propulsion systems. To do so has demanded greater emphasis on efficiency and economy. The fiscal realities of a limited budget and the increased cost of new ships and weapons must be reflected in our long-range objectives and in the more immediate planning to retire old weapons as new ones prove themselves. To reach these decisions requires close analysis of future tactical requirements and most careful selection of the characteristics of new weapons systems to be developed. Maximum readiness and immediate combat effectiveness in any emergency—at a minimum cost—will continue to guide the plans and programs of the Navy.

Two imposing technological challenges face the Navy and are receiving priority attention. The first is to design and incorporate in our ships and aircraft the capabilities necessary to counter Soviet aircraft, missiles, and submarines. The second is to exploit scientific advances in the development of new weapons to attain our own military objectives.

No weapon adds to national security unless it is in competent hands. Man must still wield weapons, however complex. Training programs of the Fleet are thus designed to keep man master of new techniques and implements as the Navy speeds integration of new weapons systems into the fleets.

The versatility of naval power is indicated in the tasks required of a weapons system. As examples, the carrier task force may be and

frequently is called on to support amphibious assault, mining operations, and antisubmarine operations, in addition to its primary function as an independent striking force. The modern aircraft carrier, configured to operate the latest fighter and attack planes, is the most versatile instrument we now have to perform these vital offensive functions. Submarines may be assigned to tasks such as radar pickets, missile launching, or for reconnaissance, in addition to their employment against enemy submarines and ocean commerce. Similarly, the guided missile systems which are under development or reaching the Fleet are intended ultimately to handle both air and surface targets, and to be able to deliver antisubmarine weapons, thus giving maximum versatility to each ship so equipped.

Supersonic aircraft, attack carriers capable of operating them; ships with missiles for air defense and bombardment; antisubmarine warfare ships, techniques, and equipment to cope with the modern submarine; and ships and aircraft to implement our new concepts of amphibious assault are already operational at sea. As the flow of these new weapons increases, fleet training and readiness assume great importance.

### **Implementation of National Policy**

Strong naval forces are deployed in the Western Pacific and in the Mediterranean. During the 1957 fiscal year these forces demonstrated that the United States is ready and determined to help our allies to maintain peace wherever it is threatened and to provide a powerful striking force commensurate to the nature and extent of aggression.

The attack carrier forces, with their mobility, power, and versatility, today constitute one of the most important tools available to those who guide the destinies of our country. These mobile airbase task forces are highly trained and ready for war now. They are immediately available for missions of mercy. They can be positioned close aboard areas where emergency action may be quickly required to protect American lives and property. In sum, these forces become a vital fulcrum in maintaining military equilibrium in areas where the balance of power may be likely to shift against the advantage of the United States.

The international situation has required the Navy to maintain the operating forces at their highest peak of effectiveness and, at the same time, to maintain additional combatant ships and an amphibious force with a reinforced Marine battalion in the Mediterranean because of the Middle East situation. This was superimposed upon the normal operations of the Navy. As a part of these normal operations, ships of the Navy and the Military Sea Transportation Service traveled

the ocean highways of the world and visited every continent and almost every country of the world which borders upon the seas outside the Soviet bloc.

Fleet operations were interrupted in the fall of 1956 by unsettled conditions in the Middle East. When the Suez crisis erupted in October 1956, following Egyptian nationalization of the Suez Canal and the Israeli attack on Egypt, all operational major fleet units were at sea in a matter of hours with maximum condition of readiness set. Similar preliminaries for expeditionary deployment were completed immediately by the Fleet Marine Force. These measures were effected on short notice, using forces in being, routine communications, and task organizations normal to the Fleet, without resort to cumbersome special groupings and elaborate advance paperwork.

The Navy took steps to protect and evacuate, as necessary, United States nationals from trouble areas. Ships, aircraft, and Marines were dispatched from the continental United States to strengthen forces normally deployed in the Eastern Atlantic and western Pacific. Antisubmarine groups, consisting of air, surface, and subsurface units, patrolled the approaches to the Americas, and the Distant Early Warning line (DEW line) was further extended to seaward.

From October 29 to November 3, 1956, the Sixth Fleet, aided by assigned Air Force units, successfully evacuated over 2,200 Americans from the Middle East. While heavy combatant ships of the Sixth Fleet provided cover, ships of the amphibious group, destroyers, Marines of the Sixth Fleet, and units of air transport squadrons went into Alexandria, Haifa, Tel Aviv, Amman, and Damascus to rescue the evacuees. Sixth Fleet ships lifted some 1,680 persons, while a lesser number, 533, were flown out in planes of the 322d Air Division. The evacuation was completed successfully and expeditiously without loss of life.

With the blocking of Suez, half of Europe's oil supply was summarily cut off. An additional 4,100 sea miles around the African coast were added to the distance between Gibraltar and the Red Sea. Thirteen fleet oilers were promptly reactivated during this emergency to augment the oil-carrying capacity of the free world.

Viewed in the abstract, the Suez crisis presented a superb test of our capabilities for meeting an emergency of significant proportions. This was a real emergency situation which demonstrated our concept of mobility and confirmed again the thesis that the Navy-Marine Corps team is in fact a precision instrument of United States foreign policy—ready, flexible, versatile, and strong. We deployed ready strength without provocation, without political prearrangement, and without fear of eviction.

Four troopships, operated by the Military Sea Transportation Service, transported approximately 10,000 Hungarian refugees to the

United States between December 1956 and February 1957 when the Hungarian uprising created the problem of caring for thousands of refugees who fled their homeland with little more than the clothes on their backs. And in late April 1957, when political unrest mounted in Jordan and the government of King Hussein was threatened, the Sixth Fleet sailed immediately from liberty ports in southern France to the eastern Mediterranean trouble zone. This fleet remained in the area for 2 weeks, emphasizing the determination of the United States that the government of Jordan should retain its authority and be kept free from subversion and attack.

Readiness of the free world navies was enhanced during the year by training of naval personnel from 23 allied nations in various Navy schools in the United States, by 17 United States Navy mobile training teams assigned to teach in specific countries, and by shipboard demonstrations at sea and in the home waters of our friends. In the Mutual Security Programs, five agreements for foreign military bases and facilities have been completed this year, and renegotiations are in progress in 14 countries. Military Material and Training Assistance Programs were implemented for 33 friendly foreign navies. In addition to Military Assistance Advisory Groups and Naval Missions continuing in 31 foreign nations, new activities were established this year in Ethiopia, Cambodia, Saudi Arabia, and the Dominican Republic. Under agreements negotiated in 1955, certain atomic weapons information is being released to the United Kingdom and Canada. Under other agreements, the first exchanges with the United Kingdom, in the field of nuclear propulsion of submarines, are well underway. An atomic weapons information course has been established for NATO officers serving with SACLANT. A considerably more liberal interpretation of the Atomic Energy Act, with regard to release of information to foreign allies, is necessary, however, in order fully to develop allied capabilities in mutual defense. Barring such a change in policy by the Atomic Energy Commission, it will be necessary to seek significant changes in law which would permit greater latitude to release information regarding military application of atomic energy.

### **Antisubmarine and Submarine Warfare**

Antisubmarine warfare (ASW) is recognized by the entire Navy as our most immediate and most serious problem. Correspondingly, efforts to solve it have assumed the greatest urgency.

Both the Atlantic and Pacific Fleets have therefore vigorously pursued antisubmarine warfare to increase their proficiency, capability, and effectiveness in this field. Few aspects of modern warfare change complexion more rapidly than does antisubmarine warfare. While budgetary considerations have hurt the overall training program,

realistic training of air, surface, and subsurface forces has nevertheless been emphasized and is paying dividends. In the training exercises, experimental tactics are being developed and evaluated to improve our Navy-wide ASW capability.

Tactical coordination between ships, aircraft, and submarines has assumed crucial importance in combating nuclear-propelled submarines. To gain experience for our antisubmarine forces in operations against higher speed submarines with longer submerged endurance, use was made of U. S. S. *Nautilus* in extensive antisubmarine operations, insofar as her busy schedule permitted. These operations resulted in improvements in our tactics. Other ASW training exercises have speeded developments in experimental tactics for air, surface, and submarine antisubmarine forces.

Although lack of sufficient ASW forces continues to limit our overall readiness, improved techniques and methods have been developed. Detection and attack ranges of ASW weapons have been increased in all types. They must be increased still more. While we have achieved much improved unit capability during the past year, the ever-increasing submarine threat has unfortunately prevented more than marginal increases in net ASW effectiveness. Technologically speaking, the threat posed by Soviet submarine capabilities is the most serious challenge which faces United States naval supremacy. If we are to counter this threat—and we must—our ASW effort must go much farther and faster.

Progress, however, is being made in development of weapons and detection systems which may be installed on all ships and permit even the largest ships to locate, attack, and destroy submarines. We have likewise successfully operated small helicopters from destroyers to extend antisubmarine weapon ranges and to speed delivery of the weapon payloads. During the past year, continued emphasis has been placed on improved ASW weapons, longer detection and attack ranges on submerged submarines, classification of submerged targets, and improved communications for antisubmarine warfare.

Due to the complexity of antisubmarine warfare and the increasing need to combat much faster submarines, progress in ASW has been slow. Greater advances will require increasing efforts, more forces, and more money.

Nuclear propulsion has dramatically released the submarine from its dependence on the atmosphere above the surface of the seas. This development of the true submarine is as revolutionary and far reaching as the change from sail to steam. Our nuclear-powered submarine program is progressing and expanding as rapidly as fiscal limitations will permit.

January 17, 1957, was the second anniversary of the initial run of the world's first atomic-powered ship, the submarine, *Nautilus*. This

submarine has continued to operate with unprecedented success. In February 1957, after having steamed for more than 60,000 miles without refueling, *Nautilus* completed operations on her first nuclear core. During the period of this report she participated in numerous fleet exercises, development projects, and evaluations. In May, after replacement of the original core, *Nautilus* proceeded to the Pacific for a 2-month cruise in order to familiarize the Pacific Fleet with nuclear submarines and to demonstrate to the ASW forces of the Pacific Fleet the special problems which nuclear-powered submarines present. En-route from New London to San Diego, *Nautilus* steamed 4,956 miles of the 5,229-mile trip submerged, surfacing only to transit the Panama Canal.

U. S. S. *Seawolf*, our second nuclear submarine, has joined the Fleet. The new ship commenced operations on March 30, 1957. On May 16, 1957, U. S. S. *Skate*, the third nuclear submarine, was launched. Three others in this class are building. Also under construction is U. S. S. *Triton*, a radar-picket submarine. *Triton* will be the largest submarine ever built and the first to have two reactors. In addition to these submarines we have authorized 12 nuclear submarines through the fiscal year 1958 program. This includes *Halibut*, our first nuclear-powered guided-missile submarine, and *Skipjack*, the first to combine the hull form of the streamlined *Albacore* with nuclear propulsion.

Until we can complete significant numbers of these radically different ships, we must rely upon our submarine force in being which is primarily composed of conventionally powered diesel-electric submarines. The majority of these submarines are now especially configured for antisubmarine warfare. Great strides have been taken in the improvement of detection capability and weapons. Rapid deployment of submarines occasioned by the November Suez emergency indicated a high state of readiness and ability to operate for long periods.

All submarines have trained hard, not only in their basic operations as submarines, but in the jobs peculiar to their capabilities, such as radar picket duties, missile launching, seaplane refueling, in amphibious operations, and in antisubmarine warfare. Much time and effort were devoted to mutual training between submarines and antisubmarine forces under realistic conditions in sea areas of interest.

Submarine missile operations have resulted in improved reliability and accuracy of delivery. Improvement of antisubmarine detection devices to increase the submarine's capability for ASW is receiving major emphasis. The use of nuclear-powered submarines as ASW units greatly increases our capability in this field. Emphasis on surface-to-surface guided missile launching capabilities by submarines will result in improved reliability and accuracy of delivery.

## Air Warfare and Air Defense

Fleet air warfare capability was increased substantially during the year by introduction of new higher-performance aircraft armed with improved weapons and the development of tactics and operating procedures to exploit these advances.

Four new models of fighters, all capable of performing offensive missions, two new light jet attack aircraft, and an improved heavy attack model entered fleet squadrons this year.

The quality of these new aircraft is indicated by the records they have won. A standard F8U-1 won the Thompson Trophy with an average speed of 1,015 mph. A3D Sky Warriors established new speed records from San Francisco to Hawaii and for a Los Angeles-New York round trip. Both range and speed were demonstrated by the non-stop flight of Crusaders and Sky Warriors from the *Bon Homme Richard* off the California coast to the *Saratoga* in the Atlantic off Florida.

More fleet pilots qualified in use of the SIDEWINDER and SPARROW I air-to-air missiles as additional squadrons received missile-equipped aircraft. Reserve aviation units began to train with P2V Neptune aircraft equipped to deliver the PETREL, air-to-surface missile.

The new fighter and attack aircraft and increased quantities of missiles contributed to improved readiness in air warfare. The addition of more angled-deck carriers equipped with optical landing equipment contributed to more efficient and safer operations, while new in-flight refueling gear has increased the range and endurance of carrier aircraft.

Many fleet air defense training exercises have been conducted during the past year, both to improve the state of training and to develop, test, and evaluate new concepts.

In order to make the results obtained from these exercises more meaningful, a new fleet air defense exercise has been developed which permits great flexibility in conduct but standardizes reporting procedures.

The degree of readiness of fleet units in air defense has been raised but still requires much improvement. As guided missile ships become available in significant numbers, a sharp improvement in air defense readiness will be realized, but further steps are still required to insure defeat of hostile electronic countermeasures and to develop improved radar.

The basic requirements for new equipment and weapons systems for improved fleet air defense—especially very high-speed missiles and longer-range radar—have been recognized for some time, and development is proceeding as fast as funds permit. In some instances, such as

air-to-air and surface-to-air missiles and associated guidance systems, material is in production.

Introduction of the A4D-1 and FJ-4B into the Fleet has resulted in an increased attack potential, which will not be fully realized, however, until squadrons equipped with these aircraft are deployed next year. The A3D, introduced to the Fleet in the previous year, has more than lived up to our expectations. Its worth has been proven in Sixth Fleet exercises.

During fiscal year 1957, the F9F-8P served as the primary photographic reconnaissance aircraft for the Fleet. A detachment of three such aircraft is now part of the air group aboard each CVA. Excellent aircraft availability, a comprehensive camera installation, and in-flight refueling capability are its salient improvements and afford fleet commanders an increased photographic capability. The F8U-1P, successor to the F9F-8P, has flown, and preliminary reports are highly enthusiastic. Photographic tests will commence late in fiscal year 1957, and introduction to the Fleet is scheduled for 1958.

The AJ-2P has continued to serve as the long-range, heavy photographic aircraft. Development of its much needed successor, the A3D-2P, has progressed materially. By virtue of its increased speed, range, altitude capability, and modernized camera systems, the A3D-2P represents a significant advance in the photographic reconnaissance field. For the first time photo reconnaissance planes will be first-line operational aircraft and will be capable of performance equal to or in excess of that of other Fleet aircraft.

In February 1957, the last of 4 TF-1Q aircraft were delivered to the fleets (2 to each fleet). These aircraft are configured with a full assortment of the latest electronic-countermeasures (ECM) equipment, including jammers. Employment of these aircraft to simulate aggressor forces will afford fleet units the opportunity to operate against the ECM threat and tend to stimulate development of counter countermeasures technique and equipment.

Airship squadrons are now fully equipped with towed sonar with improved sonar ranges in all water conditions. The sonar can be towed at speeds above 25 knots and varied in depth from the surface down to depths well below the isothermal layer.

During the past year, the antisubmarine helicopter program has progressed. Evaluation of special instrumentation for night and limited visibility mission work has been completed. Helicopters of the HSS-1N type will be delivered to the fleets beginning in March 1958. An additional antisubmarine helicopter squadron was formed in June 1957.

At the end of fiscal year 1957, Atlantic and Pacific stations of the seaward extension of the Contiguous Radar Coverage System were

manned continuously by ocean radar station ships (YAGR's) supplemented by radar picket escort vessels (DER's). During part of the time an airborne station was maintained aboard an airship. Radar picket escorts and WV-2 Super-Constellations also provided part of the Atlantic seaward extension of the Distant Early Warning line.

In the Pacific, Super-Constellation squadrons to be used on the extension of the DEW line were formed and trained. The YAGR's are Liberty Ships modified to accommodate electronic detection equipment. The final four will be completed in 1958. The last DER's are under conversion now. These, with airborne early warning aircraft squadrons, will extend the DEW lines in the Atlantic and Pacific and are already now operating on a limited schedule.

### Surface Warfare

In the field of surface warfare, the year's operations consisted of exercises in anti-aircraft and surface gunnery, shore bombardment, and torpedo firing. New exercises for surface-to-air missiles and surface-to-surface missiles were devised for guided missile ships joining the fleet. A moderate improvement in conventional gunnery and torpedo performance was achieved.

The delivery techniques of the four REGULUS assault missile-equipped cruisers have been steadily improved, resulting in better accuracy and extended ranges. Transfer of missile control from cruisers to submarines stationed nearer targets has been successfully accomplished. The major advances have thus been in guided missiles.

Although attention naturally focuses on the more exciting aspects of naval warfare, such as nuclear propulsion, missiles faster than sound, and the miracles of modern electronics, the Navy can never forget that sailing, fighting, and surviving on the surface of the sea is the fundamental business of sailormen, and one which is neglected at peril. Readiness in surface warfare demands high proficiency in the basic nautical skills, and, as such, is a matter of continuing attention and pride throughout the Navy.

### Amphibious Warfare

The ability to conduct amphibious operations is one great test of a nation's maritime competency to exploit control of the sea. Today, our skill and organization in this mode of naval warfare constitute perhaps the only major military capability of the United States which is wholly unmatched by ally or potential enemy. If we would follow the maxim, "*Be strong where the enemy is weak,*" continued progress in modern amphibious warfare—especially of the new vertical-assault technique which gives so much promise—is of high importance.

Amphibious training during the past year was therefore oriented toward further development of vertical envelopment and separated-unit assault tactics.

Training in and evaluation of vertical envelopment assault has up to now depended upon makeshift and temporary arrangements aboard aircraft carriers when available. A quantum increase in tempo and effectiveness of vertical envelopment progress resulted after the reporting of the experimental Assault Helicopter Aircraft Carrier, *Thetis Bay*, to the Pacific Fleet in September 1956. The *Thetis Bay* is the first such ship of her kind in the world, and has been specifically set aside for the primary task of developing and testing the vertical assault concept pioneered since World War II by the Marine Corps and the Navy.

Adequacy of amphibious training was limited by existing force levels and further limited in particular by requirements for amphibious ships in nonamphibious operations. Eleven amphibious ships participated in Arctic and Antarctic operations for periods varying from 4 months to the full year. Existing amphibious force levels are barely sufficient to provide essential training for the Fleet Marine Forces, let alone the amphibious training requested by the Army.

Considering the obsolescence of ships and the lift available, readiness for conventional over-the-beach amphibious assault operations is adequate and 3 division/wing, 1 brigade/wing, and 5 RL/T/air group exercises were conducted during the year.

### **Mine Warfare**

Mine warfare operations, in addition to routine training, consisted of NATO exercises in the Mediterranean and Eastern Atlantic, and cold weather exercises off Argentina. Harbor defense, which depends basically upon controlled mines, nets, and underwater detection equipment, has been taken over, to a large degree, by Naval Reserve Harbor Defense Divisions, which have been effectively integrated into our harbor defense organization. Fleet exercises, such as those conducted by the Seventh Fleet, provided excellent opportunities for improving readiness in aerial and surface mine-laying, and successfully tested our ability to conduct offensive mining. In general, all our mine warfare exercises (many of which focus particularly on antisubmarine warfare) have the threefold objective of testing mines now on hand, testing new mine-countermeasures ships and gear, and developing mine warfare tactics.

### **Fleet Operations and Training**

Ships of the Atlantic and Pacific Fleets operated in all oceans of the world. Their varied tasks bespeak the roles which the United States Navy plays in world affairs.

The Sixth and Seventh Fleets maintained equal readiness to meet local aggression or all-out war. Each fleet is capable of performing any foreseeable immediate assignment without assistance from the continental United States.

Ships of the Atlantic Fleet operated in the Arctic, Antarctic, Caribbean, the Pacific and Atlantic Oceans off South America, in the Atlantic and Indian Oceans off Africa, northern European waters, the Mediterranean, the Red Sea, and the Persian Gulf. Carriers, cruisers, destroyers, submarines, mine warfare ships, amphibious ships, and auxiliaries served their tours with the Sixth Fleet in the Mediterranean. Destroyers from the Sixth Fleet transited the Suez Canal at regular intervals when it was open, and served about 1 month each in the Red Sea and Persian Gulf. When the Suez Canal was closed, destroyers traveled to and from the Red Sea-Persian Gulf area by making the long trip around Africa. During the summer of 1956, ships of the Atlantic Fleet cruised in European waters on training cruises for midshipmen and, during the remainder of the year, individual ships showed the flag in that area.

In the Pacific, Navy and Military Sea Transportation Service ships also operated in the Arctic, Antarctic, and off the coast of South America. Ships of the Pacific Fleet have trained and cruised in the waters of the Western Pacific from Japan and Korea to Australia and New Zealand, and, on occasion, have visited India and Pakistan.

In the home waters of the Atlantic and Pacific, day-to-day operations of the Navy continued. Ships conducted independent exercises and operated with other ships of their own types, while engaged in basic training. Numerous intertype exercises were conducted.

Less time was spent in home ports than is desirable from a morale and upkeep viewpoint. Some ships never left home waters, but their operations were no less important or significant than those of ships on station overseas. The duties which fall to these ships are: Barrier Operations in the Atlantic and Pacific in the Continental Air Defense System, development projects to improve weapons and procedures, tender services for destroyers and submarines, training in mine warfare, training services for other ships, and many special tasks.

#### *Major Exercises*

Fleet operating proficiency is maintained in peacetime by constant shipboard drills and continuing exercises between ships of the same type and with ships of different types. Exercises are both national

and international. In fiscal year 1957, the following national and international exercises were carried out:

	<i>Exercises</i>
Atlantic Fleet.....	33
Pacific Fleet.....	21
Sixth Fleet.....	28
Seventh Fleet.....	11
NATO.....	4
SEATO.....	5

The prime objectives of the multilateral (international) exercises are to promote a close working relationship among members of the NATO and SEATO organizations and to develop and test combined plans, doctrines, and tactics.

The following exercises and operations are covered in more detail because of their size and scope, or because they are representative of the NATO and SEATO exercises in which the United States Navy played a major role.

An Allied Command Atlantic exercise, GULF STREAM, was conducted in September 1956 to test and rehearse plans for rapid transition from a peace to war footing in preparation for large-scale NATO tactical exercises scheduled for the fall of 1957. A NATO mine warfare operation, CUTLOOSE, was conducted in the English Channel in the fall of 1956, when British, French, Belgian, Netherlands, Norwegian, and United States units exercised together in mining, mine countermeasures, and coastal defense.

TEAMWORK, a bilateral Thai-United States amphibious exercise, was conducted off Thailand in September and October 1956 by Pacific Fleet ships, aircraft, and Marines, to demonstrate modern United States amphibious capabilities and methods. ALBATROSS, conducted in the South China and Sulu Seas during the same period, was a major SEATO joint air-sea operation. Conceived and sponsored by the Royal Australian Navy, its primary purpose was to determine and solve the problems of integrating naval units of the various SEATO powers. Ships and aircraft from Australia, New Zealand, the United Kingdom, Pakistan, Thailand, the Philippines, and the United States combined in a fleet of more than 25 warships for this exercise. Despite anticipated language problems, the various navies learned and achieved a great deal.

The largest number of ships and men joined in any one operation in the Pacific since the conquest of Okinawa in 1945 was employed in Exercise BEACON HILL, which was conducted in the Philippine Islands during March and April 1957 by the Seventh Fleet, the 3d Marine Division, and the 1st Marine Aircraft Wing, to provide fleet units with training in special weapons exercises and amphibious operations. Approximately 92 ships, 400 aircraft, and 60,000 men were

involved. The culmination was a full-scale amphibious assault (witnessed by the President of the Philippines and international observers) by the Marine air-ground task force in the newly available Laur training area of Luzon.

A joint amphibious exercise in the Panama Canal Zone, CARIB EX, tested the mobility of United States forces in defense of the canal. Army, Navy, Marine Corps, and Air Force units participated jointly. The exercise, conducted across the boundary between the United States Atlantic and Caribbean Commands, tested procedures of one unified commander in supporting another. The bulk of the participating forces, Navy and Marines, were provided and organized by the Atlantic Fleet.

During the summer of 1956 a series of nuclear weapon tests, Operation REDWING, were conducted at the Eniwetok Proving Ground as a Joint Atomic Energy Commission/Department of Defense project. Joint Task Force Seven, a permanent joint task force established by the Joint Chiefs of Staff, conducted the operation. The Chief of Naval Operations, for the first time since the establishment of the permanent task force, was Executive Agent for the JCS. United States naval ships, aircraft, and personnel participated in these important tests as part of the Joint Task Force.

REDWING was the most extensive series of tests yet conducted. The results will be reflected for many years in the future nuclear arsenal of our country and in new methods of defense against nuclear attack.

Fifty-three Atlantic Fleet ships conducted midshipman-training cruises during the summer of 1956. First and third class midshipmen of the Naval Academy and Naval Reserve Officers Training Corps (NROTC) visited ports in Sweden, Norway, Denmark, Germany, Scotland, Ireland, Spain, the Canal Zone, and Cuba. Second class midshipmen divided into two groups of equal size, had two training periods of 3 weeks each in amphibious operations in the Norfolk area and carrier operations at sea. The carrier cruises visited Halifax, Nova Scotia, and Jacksonville, Florida. During part of this same period, 600 West Point second classmen were indoctrinated in amphibious warfare at the Naval Amphibious Base, Little Creek, and afloat. Second class NROTC midshipmen, in two groups, received 3 weeks' training in amphibious operations at Norfolk and aviation indoctrination at Corpus Christi, Texas. Training was provided for approximately 2,705 USNA midshipmen, 6,130 NROTC midshipmen, and 600 West Point cadets.

In the summer of 1957, 5,935 Naval Academy and NROTC midshipmen from colleges and universities throughout the United States took part in three cruises designed to give them an opportunity to learn firsthand the naval officer jobs for which they are in training.

At Annapolis and in Norfolk the Practice Squadron, consisting of the battleship *Iowa*, the tactical command ship *Northampton*, the cruisers *Macon* and *Canberra*, and 12 destroyers, embarked 1,008 Naval Academy midshipmen and 940 NROTC midshipmen. The Service Force ships, *Waccamaw* (AO-109) and *Nantahala* (AO-60), supported the Practice Squadron.

The ships remained in Norfolk for the International Naval Review. They then departed Norfolk for Rio de Janeiro and Santos in Brazil, Trinidad, St. Thomas, and San Juan. As part of the training for the midshipmen, the squadron operated off Culebra and then spent 2 days in Guantanamo Bay, Cuba.

On another training cruise, 2,085 NROTC midshipmen boarded the battleship *Wisconsin*, the cruisers *Boston* and *Albany*, and eight destroyers, for a cruise off the west coast of South America, with U. S. S. *Pawcatuck* (AO-108) furnishing support. After taking part in the Jamestown Festival International Naval Review, these ships got underway via the Panama Canal for Valparaiso, Chile, and returned to Norfolk via Cristobal and Balboa in the Canal Zone, Guantanamo Bay, and Roosevelt Roads at the eastern end of Puerto Rico for gunnery and operational training.

A third cruise took 1,120 NROTC midshipmen from Norfolk to Quebec, aboard the cruiser *Des Moines* and 12 destroyers and destroyer escorts, supported by U. S. S. *Allagash* (AO-77).

The International Naval Review which was held in connection with the Jamestown Festival at Hampton Roads, Virginia, on June 12, 1957, was the first staged in this country in 50 years and was the largest ever held, even surpassing that held in 1953 at Spithead, England, for the coronation of Queen Elizabeth II. Only two international naval reviews have been held previously in United States waters, in 1893 and again in 1907. The theme for the 1957 review was Freedom of the Seas. The Naval Review was a static one with all ships except the Underway Group being at anchor in Hampton Roads in the vicinity of Old Point Comfort, in two lines, from the east end of Thimble Shoal Channel to Old Point Comfort. Eighty-seven United States ships and 33 foreign ships representing 17 nations participated.

#### *Atomic Weapons Training*

The Navy's capability in employment of atomic weapons continues to expand.

During 1957, this expansion was highlighted in the antisubmarine and guided missile fields. The Navy's principal existing delivery capability, carrier-based aviation, was materially strengthened by new construction and modernization of existing carriers.

Training has been, basically, a continuation of programs of the previous years. Significant adaptations have been made, however, to meet changing trends. The Navy depends on the Armed Forces Special Weapons Project (AFSWP) for most of its personnel training in special weapons maintenance, test, and assembly. During the past fiscal year, an enlisted general service rating for Nuclear Weaponsman (NW) was established. When effective during the next year, this rating is expected to provide greater stability among enlisted men in the nuclear weapons field. General indoctrination training has been expanded and, in the future, will be pointed toward junior line officers under the concept that all line officers should know the fundamental application of nuclear warfare.

Primary Navy contribution to NATO in the atomic training field was establishment of an "Atomic Weapons Information Course" for SACLANC officers, mentioned earlier. These courses are conducted quarterly at the Special Weapons Schools, Fleet Training Center, Norfolk.

#### *Guided Missile Training*

Shore-based technical training of maintenance and operational personnel for guided missile ships is proceeding at a rate sufficient to insure immediate availability and a subsequent orderly flow of adequately trained personnel to ships as they are commissioned. Training for surface-to-air and REGULUS I missiles is being conducted at the Guided Missile School, Dam Neck, Virginia, for guided missilemen, and at the Naval Training Center, Great Lakes, Illinois, for fire controlmen and gunners mates who will be assigned to guided missile systems. All operational training will be conducted on board guided missile ships, using installed equipment. Simulation equipment to facilitate basic training of detection, weapon direction, and weapon control men is under development. This gear will permit coordinated drills of the Combat Information Center, weapon direction, and weapon control teams in all phases of the missile firing problem up to the point of actually firing. Operational ships will be used as "school ships" for precommissioning training of new construction and conversion crews; shore-based research and development and evaluation facilities will also be used for this training, if available. REGULUS I training afloat is being accomplished in conjunction with missile tests, training firings, and drone configured aircraft flights. Training in coordination of surface-to-air guided missiles with other air defense weapons, i. e. interceptors, will be carried out at sea by Fleet air defense exercises supplemented by air defense trainers located at the two Fleet Air Defense Training Centers. Missile allowances for operational training, while not generous, should

be adequate. These training firings will be used primarily as system proof firings; quality control information will also be obtained by telemetering in-flight data from the maximum number of training missiles. Preliminary tactical doctrine and training exercises for surface-to-air missile ships and for REGULUS I operations have been published.

#### *Naval Air Training*

During fiscal year 1957, training of student naval aviators was appreciably modified.

The all-jet syllabus (150 hours) for advanced training, started in 1956 on a limited basis, has been expanded this year to approximately 35 percent of student aviators in training to fly jet aircraft. This syllabus provides that all flight training while in the Advanced Training Command is in jet aircraft. Further expansion of the all-jet advanced syllabus will be accomplished when construction work on the master jet training fields at New Iberia, Louisiana, and Meridian, Mississippi, is completed.

A large portion of the helicopter and lighter-than-air training has been incorporated into the "pipeline syllabus." This provides for training students in helicopters and airships following completion of phase "A," the all-weather flight phase of Advanced Training, whereas in previous years both were given only as postgraduate courses to designated Naval Aviators.

In late 1956, the "split pipeline" concept was implemented. Under this concept, all students receive the same primary training, after which they split into fighter/attack and antisubmarine training.

In May 1957, U. S. S. *Antietam*, an angled-deck carrier, replaced U. S. S. *Saipan* for student pilot carrier-deck qualifications. This permits use of jet trainers for carrier qualification of students.

Students are now commissioned and designated Naval Aviators upon completion of the Instrument ("A") Stage in Advanced Training.

During fiscal year 1958, inputs for student training will be adjusted as required in order to produce an annual output of 2,900 aviators.

Modernization of the Naval Air Reserve Training Command has likewise continued rapidly throughout the past year. This modernization process has been particularly evident in the all-important field of antisubmarine warfare, and has resulted in a complete phasing out of the single-engine AF (Grumman Guardian) and a corresponding influx of the twin-engine S2F (Grumman Sentinel) which features the most modern and effective airborne ASW equipment available. Further evidence of rapidly improving ASW capability within the Naval Air Reserve is the rate at which the mod-

ern P2V (Lockheed Neptune) is replacing the P4Y (Consolidated Privateer). The P2V, like the S2F, is equipped with the latest available ASW systems. This modernization process will be completed by assignment of ASW helicopters to the Naval Air Reserve Training Command as they become available in sufficient numbers.

In order to qualify pilot and enlisted crews in efficient operation and maintenance of the complex gear aboard these modern ASW aircraft, the scope of the program, providing additional active duty for transitional training (in excess of the regularly scheduled 14 days annual active duty for training), has been extended to include pilots and enlisted crew members of propeller-driven S2F and P2V aircraft. This program has been most successful and will be continued, within budgetary limitations, until no longer required.

An additional measure, designed to increase ASW capability of flight crews within the Naval Air Reserve Training Command, is the ordering of selected individuals to additional active duty for training to attend courses at the Fleet Airborne Electronics Training Units of the Atlantic and Pacific Fleets. This is the most effective means now available to qualify reservists in the latest fleet tactical employment of modern ASW aircraft.

### **Communications**

The successful prosecution of fleet operations depends increasingly upon electrical methods of transmitting information. The material base for the rapid communication of raw data, its coordinated translation into plans, and the execution of these plans continues to be expanded, although more slowly than appears essential.

The Suez crisis, although successfully handled by existing communication facilities, drove home the urgent need for handling enormous quantities of data at speeds far in excess of those now consistently attainable. The precautionary deployment of U. S. Navy forces in the European area required the handling of information in a volume approaching that of wartime. It was typical of the disturbances for which the Navy and Marine Corps are always ready.

The welding of NATO navies into an effective organization has led to increasing integration of the U. S. Navy with NATO, or vice versa. SACLANT, in this period, was largely dependent upon U. S. Navy communications to bind his units into an effective force, and to a lesser extent, the coordination of NATO's Mediterranean naval forces depend upon U. S. Navy communications. This dependence is expected to continue into the indefinite future.

The rudiments of a CNO and Fleet command system incorporating the mass, rapid transmission of detailed machine data have been developed. Incorporating the latest technological advances, these command centers increase materially the effectiveness of worldwide sur-

veillance of seaborne threats to the national security and control of naval forces.

Automatic message-handling devices were installed at an accelerated rate. Refined equipment incorporating automatic security devices continued to be installed afloat and ashore.

Installation of radically new, high-intensity searchlights has significantly increased the effective distance of visual intratask force communications.

The installation of single-sideband voice equipment in selected ships for close tactical coordination of forces was given high priority. This has greatly facilitated personal contact between commanders, and with the provision of security, this capability is expected to be increasingly effective in affording high-level coordination between major forces.

Replacement of over-age World War II equipment by more modern and better equipment has continued. Even more important was the introduction of equipment employing new methods (i. e., data-transmission systems with security features), geared to transmit information at speeds of several thousand words a minute, both afloat and ashore.

The success of DEEP FREEZE II and the Arctic DEW line resupply operation showed that efforts of the past years to develop more efficient extreme-latitude telecommunications have been successful. Sponsored by NATO, tests of extreme-latitude communications were conducted by U. S. S. *Northampton*. Although results have not yet been fully collated, indications are that further efforts in areas of extreme latitude show great promise.

#### *Aircraft Communications*

The Navy is making a continuing effort to replace obsolete aircraft radio equipment with gear of the most modern design.

Today's naval aircraft requirements for long-range communications are being met by installation of modernized transmitters providing high effective power output, greater frequency stability, larger capacity for preset channel selection, and economies in size and weight. New early warning aircraft and long-range patrol and reconnaissance aircraft will be delivered equipped with the modernized high frequency transmitters. Plans to replace obsolete transmitters in existing fleet aircraft have been completed, but implementation is still pending budgetary considerations. These sets will replace the present high frequency aircraft transmitter which has served fleet aircraft for about 14 years and no longer can meet present or anticipated operational requirements. Development efforts are concentrated upon the incorporation of the significant advantages of the single-sideband technique in future airborne and air base equipments.

*Fleet Communications*

During the past fiscal year, trial development of new fleet dispositions was hampered because communication equipment for use on maneuvering, warning, and combat information radio circuits was incapable of fulfilling requirements for increased ranges.

Considerable progress has been made, however, through demonstrations of the single-sideband radio communications during fleet exercises. These demonstrations proved that this technique offers a significant improvement over the double-sideband technique now used in fleet equipment.

An urgent interim procurement program has been inaugurated to outfit all major combatant ships with commercial-type single-sideband sets capable of providing improved voice communications over the increased ranges required by new Fleet dispositions. Delivery and installation of this equipment in ships of the Fleet will be completed early in 1958.

Meanwhile, single-sideband communication equipment, built to military specifications, is under evaluation and is due for completion in the near future.

A new technique in very low frequency reception, under investigation for some time, has been successfully demonstrated, and will make a significant contribution to submerged submarine radio communications.

One of the greatest problems involved in provision of adequate radio communications aboard ship is the antenna system. A program for improvement of design and installation of shipboard antennae has been initiated and is expected to produce increased range and reliability for all ships affected.

Reduced manning levels, due to shortage of communications personnel, continue to affect communications performance in the fleet. Some improvement should occur through increased stability in the communications ratings, brought about by incentive pay. Increased quotas to Class "A" schools, and accelerated training of radiomen in Fleet schools have already resulted in some improvement in communications performance in recent months.

Programs to increase capacity of radio trunk circuits far beyond present limits will soon begin to materialize.

The program for conversion of major activities of the Naval Communication System to a fully automatic traffic-relaying system is scheduled for completion in fiscal year 1959. This is expected to reduce the number of personnel required to operate the system and decrease significantly the time required for handling messages. A pilot model of the automatic switching equipment was installed for a 6-month test commencing on April 1, 1957.

Increasing use is being made of rapid data transmission between activities of the Shore Establishment. Electronic data transmission shows promise of substantial contributions to better administration and management of the Naval Establishment. Planning is directed toward provision of an integrated data transmission network to serve all Bureaus and the Offices of the Navy Department.

The most critical situation confronting the Naval Communication System, and one reflecting directly upon operational readiness and efficiency of the system, is the acute shortage, qualitative and quantitative, of personnel both in operational and maintenance fields. This situation has been aggravated by increased message loads and demands for new facilities and services deriving from new operational requirements. These shortages will continue to limit the capability and readiness of the Naval Communication System despite application of new labor-saving devices and techniques and all-out efforts to retrench where possible.

#### *New Developments*

Anticipating the startling advances in naval warfare presaged by high-yield weapons, missiles, supersonic jet aircraft, nuclear propulsion, and true submarines, development efforts have been directed to automatic-security and traffic-routing devices; high-speed and high-capacity data-transmission systems; a unique optical communication system; and techniques for increasing reliability, range, and speed of radio transmission, plus improved reception of very low frequency signals for Arctic and submarine operations.

### **International Geophysical Year and Cold Weather Operations**

#### *Operation DEW line*

The Navy once again undertook the gigantic task of resupplying the Distant Early Warning line sites ringing the Alaskan and Canadian Arctic during the summer and fall of 1956. The sea-lift phase of the joint operation was placed under Commander, Military Sea Transportation Service.

During Arctic operations 1956, over 220,000 measurement-tons of cargo and 3,000,000 barrels of oil and lubricants were delivered to DEW line sites and the far north weather stations and air bases. This was accomplished by 122 ships, including Navy fleet, Coast Guard, and Military Sea Transportation Service (MSTS) ships, and 1 Canadian icebreaker. Long- and medium-range ice reconnaissance flights were flown throughout the operation, and commands concerned were advised of ice conditions in the area. No ships or lighterage were lost. All cargo was delivered as planned in all areas, and the ships used were found suitable. Relatively better weather and ice conditions and flexible stowage and scheduling permitted a much

shorter turnaround in the central DEW line areas. All cargo operations were completed in the western section of the DEW line on August 25, 1956, compared to September 16 for 1955 operations, and the last ships to withdraw cleared Point Barrow on August 28, 1956.

Plans for the 1957 resupply of Arctic bases called for delivery of approximately 50,000 measurement-tons of cargo and 3,000,000 barrels of oil and lubricants and employment of close to 100 fleet, MSTS, and other ships.

As fiscal year 1957 ended, the severest ice conditions in recorded history of the Arctic challenged the Arctic fleet of the Military Sea Transportation Service.

The 3-phase program delivered extensive equipment and supplies to the trans-Arctic DEW line, to United States military commands in northeastern Canada and Greenland, and to United States Government Pribilof Islands sealing stations off the coast of Alaska.

An historically colorful aspect of the program is our determination to find a usable deep water route across the top of North America. This practical northwest passage is urgently needed in order that MSTS ships may retire eastward to the Atlantic if the Arctic icepack suddenly springs against the northern coast of Alaska at Point Barrow and traps ships which have entered the Canadian Arctic from the Pacific.

During these past 2 years, MSTS shipping carried over 1,000,000 tons of cargo, equipment, and fuel to defense stations during the short summers of the frozen north. Cargo-handling troops of the U. S. Army Transportation Corps put in round-the-clock hours to unload the ships so they could head homeward before the encroaching Arctic icepack froze them in for the winter.

The fleet which carried out the 1957 DEW line operations included: A transport, an AGC, Victory- and C-1-type cargo ships, T-1 and T-2 tankers, landing ships (LST's and LSD's), buoy tenders, salvage and repair ships, survey ships, and icebreakers. The LST's and LSD's carried Army shore parties with their lightering and equipment.

One icebreaker, HMCS *Labrador*, is the only deep-draft ship ever to negotiate a northwest passage. The route followed by *Labrador* in 1954, however, is impracticable for cargo ships. The route it is hoped to develop (Prince Regent Inlet, Franklin Strait, and Bellot Strait) was partially surveyed during 1955 by the Canadian icebreaker and by Navy planes using vertical and oblique aerial photography.

#### *Operation DEEP FREEZE*

Navy ships departed for Antarctica on Operation DEEP FREEZE II during October and November 1956. The mission of this operation

was to establish bases for the scientific operations of the International Geophysical Year (IGY) in Antarctica and to resupply existing bases. Six of these stations are scattered around the circumference of Antarctica and in the interior. One station, located at Cape Hallett in the Ross Sea, is a joint United States-New Zealand station. Three other scientific stations on the coast are:

- (1) Little America—on the Ross Ice Shelf near the scene of Admiral Byrd's early expedition.
- (2) Wilkes Station—on the Knox Coast near Vincennes Bay.
- (3) Ellsworth Station—on the coast of the Weddell Sea on the Filchner Ice Shelf.

Two stations are located inland, one in Marie Byrd Land, called Byrd Station at latitude 80° S., longitude 120° W., and the Amundsen-Scott Station at the South Pole itself. The principal operating base of Operation DEEP FREEZE is Williams Air Facility at McMurdo Sound on the Ross Sea. About halfway between McMurdo and the South Pole, a temporary auxiliary air operating facility was established to assist flights from McMurdo Sound to the Pole.

The dedication of the Amundsen-Scott South Pole Station took place on Wednesday, January 23, 1957, at Williams Air Facility, McMurdo Sound, Antarctica. The program honored Roald Amundsen, the first man to reach the South Pole, in 1911, and Captain Robert Scott, RN, England's famed explorer who reached the Pole shortly after, in 1912. The ceremonies originally were planned for the newly constructed South Pole base, but limited transportation precluded this.

Twelve ships, 39 aircraft, and 3,750 personnel took part in Operation DEEP FREEZE II. Of the personnel involved, 285 were from the 63d Troop Carrier Wing, USAF, who flew and serviced the eight Air Force Globemasters used to drop supplies at the Pole and Byrd Stations.

By mid-February, all United States IGY stations were completed and commissioned, and most of the ships had departed for their home ports. A great many hazards and difficulties, a large portion of them unforeseen, were overcome in the completion of these stations.

In November 1956, a small group of Navy and Marine Corps personnel headed by Read Adm. George Dufek, Commander Task Force 43, were the first Americans to reach the South Pole. This also was the first landing at the Pole by an airplane. By January 10, the Pole Station was established, and in mid-February, Air Force Globemasters made final parachute drops of equipment. Scientists, flown in by R4D aircraft, then set up their instruments for the 2 years of observations at this remote spot.

In Marie Byrd Land a tractor train, preceded by an advance party, delivered two loads of cargo to Byrd Station. The advance party bridged the heavily-crevassed area between Ross Ice Barrier and Rockefeller Plateau, a task requiring tremendous engineering skill, considerable boldness and daring, and many thousands of pounds of explosives. Final deliveries of equipment by parachute made Byrd Station fully ready by March 1.

The Ellsworth Station was established with difficulty on the shores of the Weddell Sea, by the icebreaker *Staten Island*, the cargo ship *Wyandot*, and Seabees of a mobile construction battalion. Although the ships penetrated the Weddell Sea farther than any ships have gone before, they were unable to land parties because of ice conditions and were forced to return eastward several hundred miles before an unloading site could be located. Before reaching their destination, weeks late, they had traversed 2,000 miles of heavy ice pack, and had once been ice-bound for 11 days. The station itself was built in a scant 2 weeks with half of *Staten Island's* crew assisting in the construction, and portions of *Wyandot's* crew assisting after their ship was unloaded. Both ships were damaged and forced to make repairs to hull or engines during this period.

Establishment of Cape Adare, a joint United States-New Zealand Station, was disrupted by a heavy storm which set a vast ice field down on the U. S. S. *Arneb* and the Coast Guard icebreaker *Northwind*. Though seriously damaged by ice, *Arneb* was able to repair herself and continue to her next assignment, Wilkes Station, on the Knox Coast. Here again, it was necessary to traverse heavy ice pack before *Arneb* and *Greenville Victory* could discharge cargo in Vincennes Bay. The station was built with the help of ships' crews in about 2 weeks.

At McMurdo Sound, ice made it impossible for ships to get within 9 miles of the base. Then the ice broke, the weather improved, and temperatures rose so high that the ice runway, from which aircraft operated, became unsafe, and it was necessary to return the Globemasters to New Zealand until falling temperatures restored the airstrip to usable condition. At Little America, another large base, and one of the International Geophysical Year (IGY) Stations operations were hampered the entire summer by storms, heavy ice, and repeated collapse and breaking off of ice "docks" on which ships were attempting to unload.

At the end of the operation, hardly a ship had escaped damage, and hardly a single phase had gone off exactly as planned. Despite these hindrances, Operation DEEP FREEZE II succeeded. All IGY Stations were completed and McMurdo Air Facility was ex-

panded and supplied for the forthcoming winter. Until October 1958 our Antarctic bases are entirely on their own.

### **Operational Development Force**

The Operational Development Force plays a most important role in research and development. Following completion of fundamental research and preliminary development, this command conducts the operational evaluation of new weapons and equipment, including tactics for their employment, before their introduction into the Fleet. At the start of fiscal year 1957, 158 evaluation projects were assigned. An additional 62 were added during the year. Of the total of 220 projects, 75 were completed. Many of the remainder are continuing projects while others are waiting delivery of material. The majority of proposals evaluated were in the fields of antisubmarine warfare, carrier aircraft equipment and tactics, and ship armament.

### **MSTS Operations**

The Military Sea Transportation Service (MSTS) continued its support of the armed forces and moved millions of tons of cargo and hundreds of thousands of personnel all over the world. MSTS provided sea-lift support of DEW line and other Arctic projects. Resupply of our Arctic outposts, including the DEW line, was accomplished during the summer and fall of 1956. Over 220,000 measurement tons of cargo and 3,000,000 barrels of oil and lubricants were delivered in spite of severe ice conditions. In addition, MSTS also furnished cargo vessels to the Antarctic naval task forces.

From July 1, 1956, to June 30, 1957, 14,138,000 measurement tons of dry and reefer cargo, 745,000 passengers, and 15,520,000 long tons of petroleum were transported by MSTS. The cargo and passenger lifts were 6 percent and 13 percent less, respectively, than in the preceding year. Reduction in passenger lift is attributed to reduced movement of troops overseas, and increased use of air transportation by the Services to take advantage of reduced time in transit. Petroleum lift shows an increase of 20 percent above the preceding fiscal year, occasioned by the Suez crisis.

Total cost of providing ocean transportation amounted to \$477,211,236 for the year, a 16 percent increase over fiscal year 1956. Increased costs resulted from substantially increased petroleum lift, the highest fixture rates for voyage-charter tankers in MSTS history, and increased lifts effected by commercial berth lines at higher rates. Seventy-three percent of the total expenses for ocean transportation operations were paid in direct support of the maritime industry, including 64 percent which went to commercial berth operators and time and voyage charters.

### Material Condition of the Fleet

The material condition of the Fleet is satisfactory, but it is becoming increasingly difficult and expensive to keep it so. The most important factors contributing to this trend are:

(1) Price rises for labor and material during the past fiscal year, which have had to be absorbed by reducing the amount of planned maintenance.

(2) Failure to obtain adequate funds during the budgeting process to replace old ships. The average input of new ships to the Fleet is not keeping pace with the aging of the older ships. For example, the average age of the Fleet on January 1, 1956, was 10.8 years; a year later it was 11.4 years.

(3) The high and increasing tempo of Fleet operations in support of national policy. This wears out ships more quickly and allows less time for maintenance and modernization.

Our shipbuilding and conversion programs are the keys to maintaining a modern combat-effective Fleet. For many years, we have been able to maintain the strength and effectiveness of the Navy by dipping into assets on hand at the end of World War II. During this 12-year period, very few new ships were built. Conversions and modernizations of active fleet and reserve fleet ships continue. We are rapidly approaching the point where it is neither practical nor economical to convert many of the remaining ships.

Long-range shipbuilding plans envisage creation of a nuclear-powered task force by the 1970 era. Fifteen nuclear-powered submarines and 1 nuclear-powered guided missile cruiser are authorized or building. Plans for the nuclear fleet of the future provide for submarines, cruisers, aircraft carriers, and frigates.

Installations which were mandatory to enable ships to operate in the Fleet and which effected essential improvements in military capabilities were accomplished under the Material Improvement Plan, which gave priority for expenditure of funds to improvement of the active fleet in striking power, antisubmarine, antiaircraft operations, and capability to operate advanced types of aircraft.

Offensive and defensive ability of the Fleet was augmented by improved electronic detection equipment, which was also within the scope of this program. Fifty-three of the 141 items under cognizance of the Material Improvement Plan were accomplished on ships which were overhauled during the first three quarters of the fiscal year. Twenty-six of the 141 items were accomplished on ships which were overhauled during the fourth quarter of the fiscal year.

In addition to 425 overhauls of active ships, regular overhauls were accomplished during the year on 29 Naval Reserve training

ships, and inactivation overhauls were made on 9 ships prior to transfer to the Reserve Fleet.

The Reserve Fleet Program now focuses on modernization and improvement of the antisubmarine warfare capability of selected Reserve Fleet ships. The past year's increment included 14 destroyers and 15 destroyer escorts out of a total of 377 ships which are to be modernized over the next few years. These improvements will enable these ships to operate effectively with the Fleet when called upon.

### **Naval Observatory and Hydrographic Office**

Although sometimes not realized as such, both the Naval Observatory and the Hydrographic Office are indispensable adjuncts to the operations of the Fleet, and are therefore under the aegis of the Chief of Naval Operations.

#### *Naval Observatory*

The Naval Observatory has continued its standard observing programs, its publications of astronomical data essential to safe navigation of ships and aircraft, and its provision of accurate time, all of which are necessary not only for the military departments but also for the civilian and scientific worlds.

Universal time (G. M. T.) is determined with photographic zenith tubes located at the Naval Observatory, Washington, D. C., and the Naval Observatory Time Service Substation, Richmond, Florida. The dual-rate moon camera is used to determine Ephemeris Time (uniform). In cooperation with the Naval Research Laboratory and the National Physics Laboratory, Teddington, England, the Naval Observatory is engaged in calibration of atomic standards of frequency.

Observations of the sun, moon, planets, and fundamental stars were continued, and observations of the international reference star program were commenced with the 6-inch transit circle. The observatory is coordinating the observations of that program being made at 11 other observatories throughout the world.

As the central agency of the worldwide moon-position program of the International Geophysical Year, the Naval Observatory has constructed 20 moon-cameras, and has obtained four measuring engines. Together with three impersonal astrolabes, these will be used for various IGY determinations.

#### *Hydrographic Office*

The Hydrographic Office has continued to carry out its mission of supplying charts, nautical publications, and navigational information to the Navy and Merchant Marine. It has strengthened relationships with similar activities throughout the world and has like-

wise increased support of Defense Department activities during the past year.

One Hydrographic Survey Group continued its regular charting work in the Mediterranean. Airborne surveys to increase isogonic information available for aeronautical charting have continued. The North Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea have been completed. Several site surveys have been made for extension of the Loran navigational system.

Extensive hydrographic support of Arctic Dewline construction and resupply was continued. Both long- and short-range ice forecasting services were provided. Efforts were continued to develop new techniques for collecting data to improve the potential of ice forecasting in future years.

Hydrographic Office participation in Operation DEEP FREEZE II included oceanographic observations and production of special charts and studies. The oceanographic observations were made from four ice-breakers and were centered in the Weddell and Ross Seas.

## IV. *The Marine Corps*

The United States Marine Corps provides the maritime expeditionary forces of the Fleet. Today, as in the past, the Marine Corps is immediately prepared to undertake its role as a national force in readiness.

The Marine Corps' goals and guidance for the past year derived from law, from Department of the Navy program objectives, and from plans of the Joint Chiefs of Staff. Essentially, these required the Corps, within prescribed strength and budgetary limitations: To maintain 3 combat divisions and 3 air wings, together with necessary reinforcing and supporting units, in a state of maximum readiness; to provide security forces for the Naval Establishment and certain other Government activities; to provide ships' detachments; to prosecute the development of doctrine, tactics, techniques, and equipment used by landing forces; to maintain a suitable basis for mobilization; and, through careful management, to accomplish these undertakings with minimum funds and resources.

Efforts to achieve these goals took the form of several major programs, each reported in a subsequent section of this chapter summarizing the most significant activities of the year and the general state of the Corps at the fiscal year's end.

In the pursuit of its objectives, the Marine Corps enjoyed its usual harmonious and fruitful relations with the other Services, especially with the Navy, with whose past, present, and future it is inseparably linked. Differences of opinion have only served to increase the common fund of knowledge, and competition, where it has existed, has only served to whet the edge of performance.

This year's report, like those of recent previous years, must draw the general conclusion that the state of the Marine Corps is excellent. The Corps—given the necessary financial support and force levels—is confident of its ability to solve the problems which confront it. It continues to stand ready for any undertaking required of it.

### **Troops**

Operating forces of the Marine Corps maintained throughout fiscal year 1957 comprised the Fleet Marine Forces, other combat forces, Security Forces, Ships' Detachments, and Marine Corps Test Unit Number One. The Fleet Marine Forces consist of the 3 combat divisions and 3 aircraft wings prescribed by law, together with necessary headquarters, combat support, and service units. Approximately two-thirds of the Fleet Marine Forces were and are assigned to the Pacific Fleet, and one-third to the Atlantic Fleet. These forces con-

stitute essential elements of a balanced fleet and provide the Fleet commander with the means to project his will ashore, wherever and whenever required by national policy.

That the Troop Program succeeded in maintaining Marine forces in a high state of readiness was vividly demonstrated during the Suez crisis, when Fleet Marine Force units took part in precautionary operations or were embarked for such operations.

A battalion landing team of the 2d Marine Division, stationed with the Sixth Fleet in the Mediterranean, played an important part in the evacuation of civilians from the Suez area. A Marine rifle company of the same division was flown across the Atlantic by a Marine transport squadron, on less than a day's notice, to reinforce a security detachment already in the area. As precautionary measures, an additional Marine regimental landing team (less a battalion) was embarked aboard ships, and held in readiness to sail from the east coast, and a battalion landing team from the 3d Marine Division, in the Far East, was promptly sent to sea on an Indian Ocean training cruise which took it within easy reach of the Middle East.

None of these measures took more than a single dispatch or a few hours to set the troops in movement. All served to demonstrate that the instant readiness of the Fleet Marine Forces is a fact, not a catchword.

#### *Fleet Marine Forces*

Important changes in the organization of the Fleet Marine Forces began to take place during the year, following approval of the report of the Marine Corps Organization and Composition Board mentioned briefly in last year's report. Generally speaking, the report called for reduction in the size and weight of the Fleet Marine Forces, especially in the Marine division, coupled with increases in mobility, flexibility, and firepower, made possible by new weapons and equipment, notably the helicopter. Reorganization had been completed in the 1st Marine Division, the 3d Marine Aircraft Wing, and selected units of Force Troops, Fleet Marine Force, Pacific. It will be extended to the remainder of the Fleet Marine Forces as rapidly as possible.

Due to personnel limitations during the year, it was necessary to maintain the Fleet Marine Forces at a reduced manning level, with severest reductions applied to support and service units. Although the readiness of the divisions and wings for immediate combat was not significantly impaired, the reduced Fleet Marine Force manning levels would have made their effect felt if the Marine Corps had been committed to large-scale, extended combat.

In addition to the Fleet Marine Forces, the category, "other combat forces," embraced a few units awaiting eventual assignment to the Fleet Marine Forces on completion of equipping and training.

### *Security Forces*

The Security Forces, which represent the second largest segment of the Marine Corps operating forces, began to present a somewhat different aspect during the past year. Whereas the historic mission of Marine Security Forces was to guard naval stations and bases, and more recently as well to protect major National Security Agency installations and State Department activities overseas, the security of Special Weapons Storage Sites now receives top priority. To meet this crucial requirement has made it necessary to disestablish several of the older security detachments. Nevertheless, at the fiscal year's end, nearly 200 Marine security detachments stood guard around the world.

### *Marines Afloat*

The third largest segment of the operating forces comprised 89 Ships' Detachments at the end of the year. Marines assigned to these detachments, in major combatant ships of the Navy, continue to provide the nuclei for ships' landing parties, manned ships' guns, served as guards and orderlies, and filled communications, staff, and liaison assignments.

Although ship's detachments now constitute a relatively small portion of the total Marine Corps commitments, this is the most ancient role of Marines and one which gives the Corps its naval character. It is thus a matter of fundamental importance to both the Marine Corps and the Navy that Marines, officers in particular, continue to serve at sea, not merely aboard transports, but in the ship's companies of men-of-war.

### *Marine Corps Test Unit Number One*

Marine Corps Test Unit Number One, which was organized in 1954 to develop doctrines, tactics, and techniques required by the modern concept for amphibious operations, successfully completed its task and was disbanded on the last day of the fiscal year.

### *Training Base and Supporting Establishment*

The Training Base and the Supporting Establishment, which sustain the operating forces of the Corps, comprise the headquarters, schools, troop bases, air stations and facilities, recruit depots, supply installations, reserve activities, and miscellaneous installations required to administer, train, and supply the operating forces. These activities continue to operate with rock-bottom austerity.

### *Deployments*

Fleet Marine Force units remained deployed overseas and in continental United States during the year. One battalion landing team of the 2d Marine Division was stationed (rotated every 5 months)

with the Sixth Fleet in the Mediterranean, and an all-weather fighter squadron of the 2d Marine Aircraft Wing was deployed to that Fleet for the latter half of the year. In the Pacific several redeployments of air wing elements were carried out to achieve better distribution of forces and to facilitate introduction of new aircraft.

### *Marine Corps Reserve Forces*

As a result of the reorganization forecast last year, the Commandant of the Marine Corps now commands all ground reserve units and ground reservists through the Directors of the several Marine Corps Reserve and Recruitment Districts, and all aviation reserve units and aviation reservists through the Commander, Marine Air Reserve Training. During the year, a number of organizational changes were effected in the interest of administrative and operational efficiency. Noteworthy among these changes were the formation of 20 new air reserve groups, the conversion of 90-mm. antiaircraft gun units to 75-mm. (SKYSWEEPER) battalions and batteries, the consolidation of air and naval gunfire liaison companies with communication-electronics maintenance companies to form communication support battalions, and redesignation of a supply company as a service battalion. Organized units of the Marine Corps Reserve comprise 242 ground units and 67 aviation units.

The Reserve exists to provide the regular establishment additional trained Marines in event of mobilization. The Marine Corps is examining its reserve mobilization requirements and methods, and developing a detailed plan to provide the required numbers and skills when needed. The growing complexity of modern warfare makes this a matter of continuing concern and effort.

## **Training**

Short of actual fighting, training is the main business of the Marine Corps. Combined with esprit de corps, training has been the foundation of the past successes and the professional character of the Corps.

### *Individual Training*

Marine officer training during the past year, and in all years before, was focused directly on the development of combat leaders.

The Marine Corps obtains (and intentionally seeks) its officers from widely diverse sources, such as the Naval Academy, civilian colleges, meritorious NCO's, and the Naval Aviation Cadet program, to name a few. To make Marine officers out of this heterogeneous input is the job of the Marine Corps Basic School, which functions as a professional postgraduate school for officers rather than as a Service academy. After completion of Basic School, the formal schooling of officers follows the standard pattern of specialist train-

ing and training at intermediate and high levels. Most officer schooling was conducted at the Marine Corps Schools, Quantico, Virginia. However, the Corps placed substantial reliance on schools of other Services and on joint schools for certain advanced and specialist types of instruction.

One hundred and seventy Marine officers of 7 to 12 years' service, plus 6 from other United States armed forces and 20 from foreign countries, received intermediate-level schooling from the Marine Corps Junior School, which teaches command and staff duties at the battalion/squadron and regiment/air-group level. In the past year, in addition, approximately 2,700 Marine officers received specialist training at schools conducted by the Marine Corps or by other Services in such fields as guided missiles, amphibian vehicles, communications and electronics, artillery, and aviation.

High-level training of Marine officers is conducted principally at the Senior School, where emphasis is placed on advanced instruction in the doctrines and techniques of amphibious warfare. During the year, 106 Marine officers, most of 15 to 22 years' service, completed this training, together with 12 officers from other United States armed forces and 8 from foreign nations.

Three thousand four hundred officer candidates were trained in the Platoon Leaders Class and the Naval Reserve Officers Training Corps; 676 were screened and trained in Officer Candidate classes and 106 in Women Officers Training courses. Initial training as officers was received by 1,560 newly commissioned officers at the Basic School. In addition, 24 newly commissioned women officers were trained in the Women Officers Indoctrination Course. Initial flight training was completed during the course of the year by 579 new Naval Aviators for the Marine Corps.

Approximately 63,000 recruits completed the 12-week recruit training courses of the Marine Corps Recruit Depots at Parris Island, South Carolina, and San Diego, California. Some 600 women completed the 8-week course at Parris Island. Vigorous efforts to improve recruit training, initiated during the previous year, were continued this year with outstanding results. On completion of recruit training, male Marines were given individual combat training at Camp Lejeune, North Carolina, or Camp Pendleton, California, before further assignment. More than 26,000 Marines received specialist and technical training. In this, primary attention was given to career Marines and noncommissioned officers who must impart their temper to the mass. Approximately 11,000 Marines—mostly headed for Alaska or the Far East—underwent rigorous cold-weather training at the Marine Corps Cold-Weather Training Center, Bridgeport, California.

### *Unit Training*

During the year, the 1st Marine Division and 3d Marine Aircraft Wing conducted a division/wing exercise on the California coast. Two "Helilexes" were conducted during which individual battalions of the division and helicopter squadrons of the wing teamed up aboard aircraft carriers to practice the modern vertical amphibious assault.

Three battalions of the 1st Marine Division conducted cold-weather training exercises at the Cold Weather Training Center, and additional battalions participated in desert exercises at Twentynine Palms, California. One air-ground brigade from the division/wing team participated in a vertical assault in conjunction with atomic tests at Nevada Test Site during June/July period.

The 2d Marine Division and 2d Marine Aircraft Wing conducted a division/wing exercise on the North Carolina coast and fielded an air-ground force of regiment/air-group size which participated with other Services in Exercise CARIBEX in Panama. The 2d Division also took part in amphibious demonstration exercises conducted for the Naval Reserve Officers Training Corps and for Naval Academy midshipmen.

The 3d Marine Division and the 1st Marine Aircraft Wing took part in two major exercises in the Far East. One, a division/wing exercise, already noted, used a maneuver area in the Philippines for the first time. The other, a demonstration conducted in Thailand under the auspices of SEATO, demonstrated vividly the speed with which military action is possible under the SEATO concept. In addition to the foregoing, the 3d Marine Division conducted 1 regimental and 3 battalion landing exercises.

The 1st Marine Brigade in Hawaii, comprising a regimental landing team and a reinforced air group, conducted a brigade landing exercise and three battalion landing exercises in the Hawaiian area.

In the Mediterranean, the Sixth Fleet battalion landing teams carried out a number of landing exercises, including several with our Allies.

Headquarters of the Fleet Marine Forces, Atlantic and Pacific, furnished command groups for the larger maneuvers in all the exercises mentioned above.

### *Reserve Training*

The average number of Marine Corps reservists (including 6-month trainees) receiving drill-pay in fiscal year 1957 was 4,050 officers and 40,312 enlisted. Three-thousand one-hundred sixty-eight officers and 26,479 enlisted Marine reservists attended summer field training in 1957. Training of ground units was carried out in two phases. At training centers this consisted of 24 or 48 paid drills. Double drills, of at least 8 consecutive hours, were encouraged and were performed

by an increasing number of units. As the culmination of the year's training cycle, annual field training of 15 days for each unit was conducted at posts of the regular establishment. Practical field work was stressed.

Reserve air squadrons and air reserve groups trained at home on an annual basis of 48 and 24 drills, respectively. All were double drills of at least 8 consecutive hours. Annual field training of 15 days for all units was carried out at stations of the regular establishment, or at home stations.

About 7,167 reservists participated as individuals in active duty for training. Some 5,000 officer and enlisted members of the Reserve served in volunteer training units and attended regularly meetings.

### *Marksmanship*

During the target year ending December 31, 1956, some 168,000 Marines fired the qualification or requalification course with the M-1 Rifle, the basic weapon of the Corps. Among recruits firing the rifle for the first time, 83.5 percent qualified as marksman or higher. A still higher proportion, 89 percent of all Marines required to fire, officer and enlisted, requalified as rifle marksman or higher during the past target year. In addition, recruits undergoing individual combat training were given an extensive course in combat marksmanship. As in previous years, interest and proficiency in marksmanship were stimulated and developed by a broad and vigorous competition-in-arms program. The success of this continuing program was attested to in September 1956, when the Marine Corps Team won all five of the Government-sponsored rifle and pistol matches at the Camp Perry National Rifle Matches.

### **Manpower**

The Marine Corps began the fiscal year at a strength of 200,780 with plans to reach an authorized end-strength of 205,735. In November 1956, the end-strength authorization was reduced to 200,000. This reduced the strength of the operating forces which, because of a year of high personnel turnover, were already suffering from a personnel shortage. The recent large additional reduction in Marine Corps strength during fiscal year 1958 will continue personnel shortage as the most serious problem facing the Corps.

### *Strength*

At the beginning of the year, 56.8 percent of the Corps' strength was in the operating forces. At year-end, despite measures taken to improve the situation, the percentage in the operating forces had increased only about 1 percent. This relatively low percentage, as compared with the fiscal year 1955 figure of 67 percent, is a direct

reflection of the high personnel turnover in fiscal year 1957, coupled with the reduction in end-strength authorization.

The following table shows the personnel distribution for fiscal years 1955, 1956, and 1957. The large allocations to the training base in fiscal years 1956 and 1957, necessitated by high personnel turnover, and the consequent reduction in the operating forces, should be noted.

<i>Category</i>	<i>30 June 1955</i>	<i>30 June 1956</i>	<i>30 June 1957</i>
Operating Forces.....	137,393	114,119	115,479
Fleet Marine Forces.....	(119,195)	(95,932)	(99,119)
Security Forces.....	(13,749)	(13,476)	(13,414)
Ships' Detachments.....	(2,971)	(3,232)	(2,946)
Test Unit No. 1.....	(1,478)	(1,479)	.....
Training Base.....	33,819	48,159	47,268
Supporting Base.....	21,720	20,367	21,742
Transients, Patients, and Prisoners.....	12,238	18,135	16,372
<b>TOTAL.....</b>	<b>205,170</b>	<b>200,780</b>	<b>200,861</b>

Fiscal year 1958 will be a year of relatively low personnel turnover. All other considerations aside, it should be a year of better personnel availability. However, recently projected strength reductions for fiscal year 1958 may alter this picture, and personnel shortage, as noted above, is likely to continue to be the most serious problem facing the Corps.

The end-strength of the Marine Corps Reserve, excluding personnel on extended active duty, officer candidates, and retired reservists, was 28,117 officers and 237,840 enlisted. The Ready Reserve, comprising personnel in organized drill-pay units (Class II) and volunteer reservists (Class III) in a non-drill-pay status, numbered 236,385, and the Standby Reserve 29,572. Under current laws, 6,112 officers and 210,330 enlisted personnel have obligated service.

#### *Officers*

Continued long-range progress was made during the year toward an optimum balance of the regular officer corps. The year started with an active-duty strength of 17,809 officers, regular and reserve, and ended with 17,434. The approved level-off structure of 8,550 regular unrestricted officers continued for the year, and was closely approximated at the year's end.

Shortages still exist in some skills—notably aviators, electronics officers, and lawyers. An improved retention rate was achieved, however, for aviators. To alleviate the lawyer shortage, legislation to create a special-duty category of officers in the legal field was approved by the Secretary of Defense, and is awaiting Bureau of the Budget action.

During the course of the year regular officers were commissioned from the following sources as indicated:

U. S. Naval Academy.....	62
Naval Reserve Officers Training Corps.....	188
Army Reserve Officers Training Corps.....	9
Platoon Leaders Class.....	26
USMC Band Officers (PL 744).....	3
Meritorious Noncommissioned Officers.....	32
Limited Duty Officers.....	7
<b>TOTAL</b> .....	<b>327</b>

The supply of regular officers was augmented during the year by regular appointment of reserve officers from the following sources:

Basic School Graduates.....	144
Former Naval Aviation Cadets.....	30
Reserve Officers from other sources.....	7
<b>TOTAL</b> .....	<b>181</b>

Of the 348 regular officers appointed in fiscal year 1954 under the provisions of Public Law 729, 79th Congress, 157 applied for retention and were retained.

The Meritorious Noncommissioned Officer Program for commissioning regular officers is now in its second year of operation, following a lapse since the beginning of World War II. This program provides a route to a regular commission for highly qualified non-commissioned officers, and taps the officer potential existing among outstanding enlisted men. This source, as indicated above, provided 32 new regular second lieutenants during the year.

The growing requirement for highly specialized officers to cope with the increasing technical complexity of new weapons is being met through a long-range program for the appointment of warrant officers and limited duty officers from the enlisted ranks. This program retains many former enlisted Marines who would probably otherwise be attracted to civilian pursuits. The program was inaugurated two years ago and continues with increasing success.

The following table indicates the numbers of Marines selected for appointment to warrant rank from the various sources:

From temporary officer status.....	42
From temporary warrant status.....	10
From enlisted status.....	49
<b>TOTAL</b> .....	<b>101</b>

Seven enlisted men were selected for appointment to limited-duty officer status.

The Platoon Leaders Class, now in its twenty-fourth year, provided the greatest number of new reserve officers. Approximately 3,000 college students, representing more than 900 colleges and uni-

versities throughout the country, participate in this program every year. They are regularly enrolled undergraduates whose military training takes place in two 6-week sessions during summer vacations. On completion of this training and receipt of a baccalaureate degree, the graduate goes to 3 years' active duty as an officer.

A sizable group of new reserve officers who are already college graduates also comes to the Corps each year by way of the Officer Candidate Program, which is the Marine Corps' principal "short lead-time" officer source. Three such courses were conducted during the past year.

The Naval Aviation Cadet Program continued to provide a substantial number of reserve officers. In addition, the Aviation Officer Candidate program helped to fill the requirement for young pilots. A third pilot procurement source, the Platoon Leaders Class (Aviation), now in its second year, provides an opportunity for air-minded undergraduates to associate themselves with a program which will lead to flight training immediately after commissioning. Indications are that this program will become a primary source of Marine aviators. As a whole, however, we are still not producing enough Naval Aviators, and the procurement of officer pilots continues to be a serious problem.

Reserve officers commissioned from all programs during fiscal year 1957 are indicated in the following table:

Naval Reserve Officers Training Corps (Contract).....	160
Platoon Leaders Class.....	522
Officer Candidate Course.....	559
Naval Aviation Cadets.....	304
Aviation Officer Candidate Course.....	81
Women Officers Training Class.....	23
<b>TOTAL</b> .....	<b>1,649</b>

The following table shows Marine officer losses from all causes during fiscal year 1957:

Terminations .....	60
Severances .....	0
Normal attrition.....	864
Reserve releases.....	1,695
<b>TOTAL</b> .....	<b>2,619</b>

Terminations consist of losses of temporary officers as part of a long-range program, first effective this year, for the gradual elimination of the temporary officer category. Severances are those of company-grade officers who have twice failed of selection and who must therefore be discharged. Normal attrition includes losses due to retirement, death, discharges, resignations, and physical disability. Reserve releases are losses resulting primarily from officers complet-

ing obligated periods of active duty. Of the total losses enumerated above, 777 were officers and warrant officers of the regular Marine Corps. Of this number, 34 retired on completion of 30 years' service and 233 with 20 or more years' service.

The major problem in the Marine Corps regular officer promotion system is the "hump"—the large number of officers of similar age and service who entered the Marine Corps during World War II. It appears that existing law will support the projected promotion program until fiscal year 1959. To prevent extremely high promotion attrition rates from then on, legislation is needed. To that end, a legislative proposal to force involuntary retirement of officers with 20 or more years of service, who have twice failed of selection, was introduced in Congress toward the end of the year.

Officer grade distribution in the regular Marine Corps at the beginning and end of the fiscal year is shown in the following table:

<i>Grade</i>	<i>30 June 1956</i>	<i>30 June 1957</i>
General .....	2	3
Lieutenant General.....	6	5
Major General.....	22	22
Brigadier General.....	33	34
Colonel .....	484	497
Lieutenant Colonel.....	1,318	1,315
Major .....	2,496	2,551
Captain .....	3,832	3,850
1st Lieutenant.....	4,628	5,112
2d Lieutenant.....	3,980	3,114
W-4 .....	95	176
W-3 .....	380	308
W-2 .....	433	295
W-1 .....	100	152
TOTAL.....	17,809	17,434

#### Enlisted

The enlisted rank distribution of the regular Marine Corps at the beginning and end of the fiscal year is shown in the following table:

<i>Rank</i>	<i>30 June 1956</i>	<i>30 June 1957</i>
Sergeant Major.....	88	185
First Sergeant.....	149	359
Master Sergeant.....	7,221	6,694
Technical Sergeant.....	9,238	9,577
Staff Sergeant.....	13,963	15,856
Sergeant.....	32,573	25,793
Corporal.....	32,047	32,518
Private First Class.....	44,055	55,272
Private.....	43,637	37,173
TOTAL.....	182,971	183,427

The high personnel turnover during the year demanded an unusually strong recruiting effort to obtain replacements for the heavy losses which were experienced; 59,950 recruits were enlisted, compared with 52,471 in the previous year.

Despite having to recruit more men, the Marine Corps raised its standards, reducing the percentage of Mental Group IV recruits to 26 percent, compared with 35 percent in the year before. The caliber of even the Group IV recruits was measurably improved, moreover, by raising the minimum qualification test score to 80 GCT.

A notably successful innovation in recruiting was enlistment of Marines for aviation duty only. Recruitment for a specific type of duty departs from past Marine Corps practice. However, the opportunities offered by the other Services for technical training in aviation had to be met.

Not enough Marines who completed their first cruise reenlisted last year. Reenlistments in this group were only 17 percent as compared with 23.7 percent during the previous year (a rate of 25 percent is the lowest which permits really satisfactory personnel stabilization). By contrast, 83.1 percent of all Marines on their second and subsequent enlistments shipped over. This is more than satisfactory. Vigorous measures have been taken to increase initial reenlistment rates. Specific reenlistment incentives were established, and several things were done to enhance the attractiveness of a Marine career. Typical among these was the emphasis during the year on the first sergeant-sergeant major program. This stress on the quality and prestige of the most senior noncommissioned officer group gives the best enlisted Marines a goal to shoot for.

Next year's reenlistment rate for men completing first enlistments is expected to rise to 20.5 percent. Not everyone who wants to reenlist will be allowed to, however. Commanding officers will only permit the reenlistment of those who have proved to be good Marines.

With less recruits required, recruiting poses no difficulties for fiscal year 1958. A further increase in quality will be a major goal, and the qualification scores for new Marines will again be raised.

During the past year noncommissioned officer promotion standards continued high. The strictness of these standards resulted in a substantial shortage of corporals and sergeants and a small shortage of staff sergeants. All ranks are expected to be filled next year. The surplus of master sergeants, which limited promotions to that rank during the 3 previous fiscal years, was finally eliminated during fiscal year 1957.

### *Reserves*

There have been significant growth and increased drill attendance in the Organized Marine Corps Reserve during the year, which re-

sulted in the attainment of the authorized end-strength by April 30, 1957. Since then, recruiting has continued, with forced attrition applied to poor attenders to improve quality.

The following table compares the end-strengths of the Organized Reserve for fiscal years 1956 and 1957.

	30 June 1956		30 June 1957	
	Officer	Enlisted	Officer	Enlisted
Ground.....	2, 478	32, 801	2, 388	35, 223
Aviation.....	1, 471	5, 763	1, 690	6, 221
Women.....	35	608	28	600
	<hr/>	<hr/>	<hr/>	<hr/>
	3, 984	39, 172	4, 106	42, 044
	<hr/>	<hr/>	<hr/>	<hr/>
Grand total.....	43, 156		46, 150	

The following table shows the year-end strength and distribution of the Ready and Standby Reserves, excluding retired reservists and those on extended active duty.

	Ready		Standby
	Drill	Non-drill	Non-drill
Officers			
Ground.....	2, 416	7, 125	10, 591
Aviation.....	1, 690	1, 460	4, 835
Total.....	<hr/>	<hr/>	<hr/>
	4, 106	8, 585	15, 426
Enlisted			
Ground.....	35, 823	163, 331	12, 431
Aviation.....	6, 221	21, 832	1, 715
Total.....	<hr/>	<hr/>	<hr/>
	42, 044	185, 163	14, 146

### *Civilian Employees*

In addition to departmental responsibility, the Marine Corps exercised management control over 20 field activities at which civilians were employed. Determination of civilian personnel requirements and allocation of civilian personnel continued to be centralized in a single staff division at Marine Corps Headquarters, which performed the same function for military manpower.

The average number of civilians working for the Corps in fiscal year 1957 was 16,500, of whom 91.3 percent were employed at field activities.

The Marine Corps industrial safety program merited the Secretary of the Navy's Industrial Safety Award for 1956. Also worthy of note is the fact that during 1956 the number of private motor-vehicle fatalities involving Marines dropped 8 percent from 1955, while fatalities for the Nation as a whole increased 5 percent during the same period.

## Material

As a result of the revised Fleet Marine Force structure, mentioned earlier, procurement was terminated in fiscal year 1957 on items of combat equipment which will be used in smaller quantities under the new organization or replaced by more advanced equipment. Where determination of needs must await refinement of the new organization, steps were taken to limit procurement in order to obviate purchases not yet clearly required.

A notable example of the application of the foregoing principles was the decision to cancel the production program for the LVTP6 amphibian tractor, with a saving of some \$33 million. Future amphibian tractor production is not expected to be necessary unless mobilization should occur before realization of the Marine Corps' planned helicopter capability. Meanwhile existing stocks of modern, post-World War II amphibian tractors will suffice to meet immediate standards of readiness.

In the artillery field, towed pieces were replaced by self-propelled weapons in two 155-mm gun battalions and one 8-inch howitzer battalion, and 90-mm antiaircraft guns in the Marine Corps Reserve were replaced with 75-mm guns (SKYSWEEPER).

Advanced new antitank weapons went to several Fleet Marine Force units during the year. A 106-mm recoilless rifle, which may be mounted on a light-weight vehicle or a ground mount, was issued to the 1st Marine Division for use in tests of the new organization.

As a further step in the Marine Corp's program to free itself from the need to employ heavy, bulky armored units, while retaining the capability to fight enemy armor, ONTOS vehicles, each mounting six 106-mm recoilless rifles, have gone to all infantry regiments of the 1st and 2d Marine Divisions replacing both the tank and 75-mm recoilless rifle in regimental antitank companies. The ONTOS (a radically designed tracked vehicle whose name, in Greek, means "The Thing"), is air-portable.

Six late aircraft models (HR2S and HUS helicopters, FJ-4 and F4D fighters, and A4D and FJ-4B attack aircraft) were delivered to Fleet Marine Force squadrons throughout the period. In fiscal year 1958, the introduction of new aircraft will continue. The F8U-1 fighter was delivered for fleet operations commencing in December 1957.

A broad effort was made by the Marine Corps during the past year to improve its supply system by making the most effective and economical use of men, money, and plant. Among the improvements in supply distribution were reduction of cross-hauling and back-hauling, satelliting small units upon nearby larger units for supply purposes,

and expansion of local purchasing, either from commercial or government sources.

Old supply categories, even though long traditional to the Marine Corps, will be abandoned in favor of new categories based on Federal Groups. This will further the Corps' participation in the Federal Cataloging Program, permit comparisons to be made with supply operations of other Services, and simplify warehousing and requisitioning, to mention only a few advantages.

Procedures were agreed to with the Army, during the early part of the year, for change to the single-manager system in the clothing and textiles. The transition took place on February 1, 1957, with transfer of ownership of Marine Corps wholesale stocks, of a value of \$97 million, to the single manager (Army). This transfer of course does not imply changes or altered standards in the tried and proven family of Marine Corps uniforms.

An important measure to simplify the supply structure of the Marine Corps was consolidation this year of Navy and Marine Corps supply responsibilities at Marine Corps Air Stations. A single department at these stations now performs all supply functions. Savings in personnel and facilities, as well as increased efficiency, will result.

Improved supply procedures provide better inventory control, facilitate stock positioning, and reduce warehouse space requirements, material handling requirements, and paperwork, and have enabled the Marine Corps to reduce material stocks in the Fleet Marine Forces without impairing readiness or combat endurance.

### **Installations**

Normal construction, replacement, and maintenance activities took place during the year at posts and stations of the Corps.

Among noteworthy major projects was the further development of permanent facilities at the new Marine Corps Auxiliary Air Station, Beaufort, South Carolina, for which \$16,190,000 has been appropriated. Operational facilities at Beaufort were 80 percent complete at the end of the fiscal year, and movement of Fleet Marine Force units to the station was scheduled to begin in the first quarter, fiscal year 1958. Capehart housing will be completed during fiscal year 1958.

Rehabilitation of the old Marine Corps Auxiliary Air Station, Mojave, California, was completed early in the year. \$10,628,000 was appropriated for new facilities at Mojave, but construction was held in abeyance pending final Congressional approval of the site.

Water rights litigation continued to pose a serious problem at the Marine Corps Base, Camp Pendleton, California, and has kept base development at a standstill. The case is due for further trial in fiscal year 1958. Meanwhile, the temporary structures which comprise the base—mostly of World War II vintage—have continued to deteriorate.

rate, maintenance costs have risen, and the occupants of the base have suffered severely from inadequate facilities.

Funds for construction of expeditionary camp facilities at Camp Smedley D. Butler, Okinawa, were reduced from \$45,000,000 to \$18,000,000 late in fiscal year 1957, and original plans for the development have been correspondingly revised. Bids on the facilities for ground units will be received early in fiscal year 1958. Architect and engineer studies on the aviation facilities were in progress at the end of the fiscal year.

At the end of the fiscal year, the Marine Corps Reserve had 233 training centers, of which 162 were jointly occupied with the Naval Reserve, 2 with the Army Reserve, and 2 with both Naval and Army Reserve. The remaining 67 comprise 40 Federally owned properties and 27 commercially leased. The Marine Corps is moving to retain commercially leased facilities only when a 50-year tenancy at nominal rental is assured. This program embraces 32 construction projects costing \$7,100,000 in all, spread over a 4-year period, and will reduce annual rentals from \$257,000 to \$95,000.

An aggressive fire-prevention program during fiscal year 1957 held fire losses in Marine Corps installations to a very low value. The number of fire department responses decreased approximately 13 percent from that of the previous year. The increased effectiveness of the fire prevention program was achieved through more effective training, and through vigorous action resulting from fire protection surveys, inspections, and investigations. The cost of fire prevention and protection was, however, reduced by deactivation of three fire stations, the elimination of billets for 103 fire department personnel, and the reduction of equipment requirements through better utilization.

### **Research and Development**

During fiscal year 1957, progress continued toward complete integration of the Marine Corps' research and development effort with the long- and mid-range objective of the Corps. The relationship of the Marine Corps' research and development effort to that of the Navy was more clearly defined, resulting in improvement of internal planning and programming procedures. Substantial advances in the refinement of the Corps' modern doctrine for amphibious warfare were achieved without impairing the combat readiness of the Fleet Marine Forces.

The U. S. S. *Thetis Bay*, which was an austere conversion to serve as a test ship to refine vertical envelopment techniques and equipment and future helicopter carriers, was available to west coast Fleet Marine Force units and Marine Corps Test Unit No. 1 during much of the year. Several landing exercises made use of the ship (described in Ch. VI of this report), enabling doctrine and techniques to be developed to

capitalize upon the many important advantages which the new helicopter carriers—the attack transport of the future—will offer.

The second annual Amphibious Training Critique was held at the Marine Corps Schools, Quantico, Virginia. All major amphibious exercises conducted during the year were analyzed. The lessons learned will be reflected during the coming year. Problems revealed by the analysis have been assigned to Fleet Marine Force units and to the Marine Corps Schools for solution.

As a part of the Material Development Program, testing was completed during the year and procurement initiated on several important items of electronic equipment, including a man-pack radar for use by infantry units in detecting and locating enemy personnel and vehicles under all conditions of visibility, a lighter and more efficient mortar-locating radar, and a helicopter-transportable radar control which will permit accurate control of air support under all weather conditions. Testing was also completed on a light-weight air-search radar of advanced design, with procurement scheduled for the coming year.

The guided-missile field continued to grow in importance. Work on a helicopter-transportable antiaircraft missile system moved ahead in a new direction when it was decided to abandon efforts to join a Navy-developed air-to-air missile with Army-developed ground equipment, and to use the entire Army system instead. Modification of TERRIER antiaircraft ground equipment to permit launching of new types of TERRIER missiles, and to improve acquisition and tracking capabilities, also went forward.

For the direct support of Marines on the ground, a joint project was established with the Army for development of LACROSSE, a field artillery guided missile which is expected to possess great accuracy and lethality. The LACROSSE missile was first conceived in 1947 by the Marine Corps itself, and the initial development work was carried out under Marine Corps and Bureau of Ordnance sponsorship.

Improvements to unguided field artillery rockets also received attention during the year. The requirement for helicopter-transportability has been stressed, as it has in consideration of a number of light artillery weapons whose potential value is being explored. Likewise it has been applied to the development of engineer and motor transport equipment, leading to lightweight equipment wherever possible and to sectionalization of heavy equipment which cannot be dispensed with. Representative of the former category are light weapons carriers ("Mechanical Mules"). In the latter category are sectionalized crawler tractors, scrapers, and graders, now being tested. Closely related to the sectionalization project is one

to develop trucks with separable bodies. This offers prospects of helicopter-transportability in addition to the possibility of eliminating large single-purpose vehicles from the combat inventory.

One major problem confronting the Marine Corps in perfecting its new tactical doctrine is that of providing operating facilities for aircraft ashore in the objective area early in an amphibious operation. This has given rise to several projects for catapults and arresting gear which would greatly reduce the length of required airstrips. Toward the end of the fiscal year, a development catapult proved successful in test launchings of attack and fighter aircraft. Pending the successful completion of this program, jet-assisted takeoff offers an interim solution and is under development for this purpose. Five sets of a successful arresting device have already been delivered to Fleet Marine Force units, and even lighter gear, easily broken down for air transportability, is under test. Progress also has been made in developing surface materials for the short airstrips which will still be needed with catapult and arresting gear. A solution to this problem, although not yet achieved, is clearly in sight.

### **Management Improvement**

The Marine Corps' management improvement program is a command tool for enhancing the combat capabilities of the Corps and assists commanders toward best use of all resources. To this end, management improvement techniques are treated as integral functions of all fields rather than a separate field of endeavor.

Although formal implementation of the program has been accomplished principally by the supporting establishment, the techniques have also been applied extensively in the operating forces to improved administrative and logistic performance. The concentration of formal effort in the supporting establishment is based on the premise that increased effectiveness in the supporting establishment is automatically transmitted to the operating forces in the form of more efficient support.

Fiscal 1957 was a year of outstanding significance in the relatively new management area of data processing. The Data Requirements Board, established in 1955, continued its overhaul of Marine Corps data systems and submitted six studies during the year.

Two of these studies will have profound effect on Marine Corps administration for years to come. In August 1956, the Commandant approved a new concept for inventory management based on high-speed data transmission and electronic computers. By mid-1958, computers will be in operation at supply centers at Albany, Georgia, and Barstow, California, and at the Supply Inventory Control Point in Philadelphia. In February 1957, the Commandant approved modernization of the Marine Corps' personnel accounting

system. Under this plan, three more medium-size computers, with transceiver networks tying them to satellite punchcard installations, will be established. From these two major data-processing systems the Marine Corps expects to realize substantial savings and increased efficiency.

Actions now under way to implement the recommendations of the Data Requirements Board and other studies in the field of data processing include the establishment of the first of eight punchcard installations to be assigned to reserve and recruitment district headquarters, development of plans for mobile machine-records installations for Marine combat forces, experimentation with new punchcard equipment specifically designed for low-volume applications, the use of the Marine Corps' first transceiver equipment (operating as part of the single-manager system for clothing and textiles already mentioned), and the conversion of several manual procedure systems to punchcard methods.

The Marine Corps has now reviewed and reissued all previous directives that remained effective. This screening permitted cancellation of 210 directives. Many consolidations were also effected, further reducing the burden of directives.

To achieve a better focused distribution, the number of possible distribution lists for directives was increased from 7 to 70. Commands will now receive only those directives which are directly applicable to them, a welcome change which also reduces the reproduction load. Under the previous system, a minimum of 3,500 copies of each directive had to be reproduced. Under the new arrangement, as few as 50 copies will often suffice. Additional savings are realized by preparing directives on oversize paper, with subsequent size reduction in reproduction. Approximately 25 percent of paper costs are saved by so doing.

### **Fiscal Administration**

Execution of the fiscal year 1957 budget was closer to plan than ever before because of an improved program and closer supervision of obligation rates, made possible by improved accounting procedures. The budget for fiscal year 1957 resulted in a total obligational authority of \$1,009,720,000 being made available to the Marine Corps for supporting the program objectives of this period.

The 1957 appropriation for Military Personnel, Marine Corps, was \$647,100,000 to support an end-strength of 205,735 Marines. However, in November 1956 the Marine Corps was directed to reduce to 200,000 by December 1956 and to maintain that level throughout the remainder of the year. This reduction resulted in a forced saving of approximately \$13 million. An additional unobligated balance of approximately \$9 million will result from lower grade distribu-

tion than anticipated and other factors that are below the costs forecast in the appropriation estimate.

The appropriation for Reserve Personnel, Marine Corps, was \$26,800,000 for an end-strength of 60,000 drill-pay reservists and for training 3,135 officer candidates. Actual drill-pay strengths were much lower than those budgeted for. The resulting large difference between budgeted strength and actual strength will result in an estimated unobligated balance of \$5 million.

The appropriation for Marine Corps Troops and Facilities was \$171,820,000. However, in expectation of increased economy and efficiency to be achieved, \$8 million was not apportioned by the Bureau of the Budget.

The appropriation for Marine Corps Procurement was \$164 million. In addition, reprogramming during the year made available some \$60 million. The major source of these reprogramed funds was the cancellation of the plan for acquisition of LVTP-6 amphibian tractors. The total accumulated amount in the appropriation for fiscal year 1957 was \$479 million, of which approximately \$263 million was apportioned. An estimated \$225,500,000 has been obligated, committed, or allotted. The balance to be carried forward to fiscal year 1958 consists of a substantial portion of committed funds and funds available for immediate citation throughout the procurement process. This availability of funds in subsequent years provides the means whereby the orderly procession of steps required by law can be taken, and, at the same time, items needed by the Marine Corps to fulfill its missions may be acquired.

## V. *Naval Personnel*

Confronted with the challenge of replacing expected large officer losses at the start of the 1957 fiscal year, the Navy successfully solved this problem by a vigorous procurement effort and the continuance of all possible measures to retain experienced naval personnel. The large personnel losses during this past year resulted from the triennial surge generated as a byproduct of the rapid expansion in 1951 for the Korean hostilities. This factor, coupled with the normal expiration of the 3-year obligated service of large numbers of reserve officers, left many vacancies to be filled during the year. Continuing replacement of losses was achieved despite these major problems.

During the year both the officer and enlisted personnel situations were stabilized, turnover of personnel without loss of operating efficiency was achieved, and all reenlistment rates improved, thus enabling more qualitative selection of personnel.

Establishment of new training courses and curricula greatly improved training, and existing training programs were revised and streamlined to keep all hands abreast of technological developments. Improving and modernizing the training program is essential since immediate quantitative and qualitative requirements are being met, but the continuing problem is to attract and retain officers and men who can absorb training and then practice the skills required of today's man-of-war to man the ships and aircraft and fire missiles that are rapidly evolving to the Navy of tomorrow.

With the above objectives in mind, the Bureau of Naval Personnel has vigorously prosecuted a program to improve the attractiveness of a naval career and to gain, train, and retain enough qualified personnel to man the operating and support forces. The results attained this past year have been gratifying. Fiscal year 1958 begins with the results of established programs already being demonstrated in the continued improvement of quality and stability of naval personnel.

The active-duty strength of the Navy at the beginning, midyear, and ending of the 1957 fiscal year is shown in the following table:

	30 Jun 1956	31 Dec 1956	30 Jun 1957
Grand total—active duty.....	669, 925	673, 065	677, 108
Total officers.....	71, 770	72, 827	73, 703
Men.....	68, 918	70, 023	70, 872
Women.....	2, 852	2, 804	2, 831
Total enlisted.....	<sup>1</sup> 591, 996	592, 764	597, 859
Men.....	586, 782	587, 636	593, 022
Women.....	5, 214	5, 128	4, 837
Total officer candidates.....	6, 159	7, 474	5, 546
Midshipment (Academy).....	3, 646	3, 735	2, 635
Naval Aviation Cadets.....	2, 513	2, 328	1, 874
OCS.....		995	780
AOC.....		416	257
Personnel in TAR billets (included above)....	13, 112	13, 385	13, 934
Officers.....	1, 290	1, 288	1, 271
Men.....	1, 251	1, 253	1, 239
Women.....	39	35	32
Enlisted (total).....	11, 822	12, 097	12, 663

<sup>1</sup> Includes officer candidates in enlisted status. As of July 1, 1956, OCS and AOC's, are included in officer candidate strength.

## Officers

Large officer losses required a tremendous procurement effort. Additionally, the continuous upswing in aviation requirements necessitated a high output in the Naval Air Training Command.

Because of the large turnover of officers, dilution of officer experience continued to present serious problems. Therefore, programs commenced in the preceding fiscal year to alleviate the shortage of experienced officers with 4 to 11 years' service continued at high tempo. Almost 700 experienced young Reserve officers were selected for the Regular Navy, and the overall challenge was met with officer strength being maintained near 73,800. The fiscal year 1958 quotas for officer procurement will not be as high as this year's. This will permit increased selectivity and stabilization of experience in the critical group of experienced young officers with 4-11 years' service.

The active-duty officer strength of the Navy by rank is shown in the following table:

	30 Jun 1956	31 Dec 1956	un30 J 1957
Active duty—total.....	71, 770	72, 827	73, 703
FADM.....	2	2	2
ADM.....	8	8	8
VADM.....	32	27	27
RADM.....	256	262	257
COMO.....	1	1	1
CAPT.....	3, 545	3, 975	3, 870
CDR.....	8, 272	8, 311	8, 325
LCDR.....	10, 902	10, 727	10, 862
LT.....	14, 430	16, 027	15, 873
LTJG.....	17, 448	16, 177	14, 589
ENS.....	11, 567	11, 772	14, 368
CWO W-4.....	323	597	859
CWO W-3.....	2, 023	1, 862	1, 656
CWO W-2.....	2, 527	2, 341	2, 053
WO W-1.....	434	738	953

During April the Aviation Personnel Division, until then located in the Pentagon under the aegis of the Deputy Chief of Naval Operations for Air, was moved physically to the Arlington Annex to become an integral part of the Bureau of Naval Personnel. The principal long-range benefit of this move is the concentration of all line officer detailing under the Chief of Naval Personnel with resultant close coordination and mutual interchange between all phases of surface and aviation detail.

Despite the large turnover of junior officers, the operating forces were manned at or above allowances, and support activities were manned at allowance. The peak turnover of officers took place during the summer. This necessitated some short gaps in the filling of shore establishment billets when an officer's obligated service was completed before arrival of his relief. During the coming year the main officer detail objective will be to maintain maximum stability of officers within the operating forces and the support activities.

### Enlisted Personnel

The two major enlisted problems for fiscal year 1957 were: (1) to improve the balance of the rating structure; and, (2) to increase the reenlistment of first-cruise personnel. Considerable effort has resulted in progress toward solution of both problems.

Imbalance existed in 60 percent of all ratings on June 30, 1956. This imbalance was reduced to 40 percent by the end of this past fiscal year. Ratings in which shortages existed were reduced by half. First-cruise reenlistments increased from 14 to 20 percent.

This improvement in first-cruise reenlistments, coupled with a slight reduction in strength, resulted in a reduction of the recruit requirement from 93,000 to about 79,000. This combination permitted the recruitment of higher-quality personnel. Coincident with the reduction in recruit requirement, the intake of undesirably high numbers of Mental Group IV (lowest mental group authorized for enlistment or induction) was substantially reduced to about 12,000. It is initially planned to recruit only men in the upper three mental groups during fiscal year 1958. This improvement is compounded by the fact that, unlike fiscal year 1956, in which 175,000 replacements were required, fiscal year 1957 had a relatively lower requirement of 125,000.

The petty officer situation for fiscal year 1957 was the best during the past decade. Petty officer promotions increased the percentage on board at the end of this year to approximately 52.4 percent, as compared to a low of 40 percent 5 years ago. Petty officer shortages were greatest in the technical ratings. To alleviate these shortages and reduce excesses where possible, efforts were concentrated on the rating conversion program initiated in 1955. This program provided for the retraining and change in ratings of suitable petty officers in overcrowded rates to those rates in which shortages existed. By vigorous prosecution of this program, the technical ratings were increased by approximately 1,500 conversions.

The active-duty enlisted strength of the Navy by pay grade is shown in the following table:

	30 Jun 1956	31 Dec 1956	30 Jun 1957
TOTAL.....	591, 996	592, 764	597, 859
E-7.....	48, 393	48, 332	48, 359
E-6.....	71, 970	71, 285	69, 783
E-5.....	64, 717	64, 385	71, 271
E-4.....	115, 922	120, 584	123, 638
E-3.....	146, 472	163, 361	182, 675
E-2.....	118, 713	110, 014	88, 114
E-1.....	25, 809	14, 803	14, 019

Significant changes in the enlisted distribution system introduced during the year will contribute greatly to the effectiveness of naval manpower utilization for years to come. The benefits will accrue both to the operating forces and the men themselves. The new techniques developed in the acquisition, processing, and communication of personnel data will permit more effective planning, greater efficiency in decision, and personal attention in the assignment of enlisted personnel.

The commissioning of the Enlisted Personnel Distribution Office, U. S. Pacific Fleet, in San Diego, on November 1, 1956, resulted from realization that distribution can be more effectively managed by the

centralization of the personnel representatives of both fleet and type commanders in one office instead of in a large number of widely dispersed small offices. Such a consolidation reduces delays previously encountered, and greatly improves efficiency in operations. Similar action was taken by the Chief of Naval Air Training in early 1957, when the 5 distributional offices of that command were consolidated into 1 office. Such a plan is under consideration in the Atlantic Fleet.

The major distributional commands are being linked together by a data-transceiver network which greatly facilitates the communication of personnel data. Data-processing machines have increased the capacity to acquire and retain more vital information on people and manning requirements. This will mean greater stability and more effective personnel for the operating forces and equitable and planned rotation for career personnel.

### Recruiting

The Navy's recruiting efforts continued through fiscal year 1957 with satisfying results. In addition to increased effectiveness of recruiters, improvements included: Better recruiting coverage through the closing of nonproductive offices, opening of new offices in more productive areas, and providing recruiters with improved convincing powers and public relations techniques both through schools and handbooks.

The immediate tangible results are clearly indicated by the following report of Regular Navy enlistments during the fiscal year:

Chargeable recruits (volunteer).....	76, 735
Enlisted women.....	1, 831
Filipinos.....	571
Other (continuous and broken service reenlistments, etc.).....	8, 551
	<hr/>
	87, 688

The present aim of the Recruiting Service is to enlist more 4- and 6-year *trainable* men without appreciable reduction in total numbers. In fiscal year 1957 the number of Group IV recruits was sharply reduced as compared with like months in fiscal year 1956. The Navy's percentage of Group IV enlistments in fiscal year 1957 was 16.4 percent. This compares with 32.5 percent Group IV enlistments for entire fiscal year 1956. It is significant that since circumstances permitted additional emphasis on selected recruiting, over half of all recruit enlistments have been eligible for immediate school assignment upon completion of recruit training.

During the past year the following new recruiting programs were initiated: (1) the "Nuclear Field Seaman Category," which channels qualified applicants through a 1-year course in nucleonics for eventual assignment to duties involving nuclear power; and (2) the "New Reenlistment Program" to stimulate reenlistment of trained ex-Navy men.

The last program features systematic contact of each discharged Navy man who has been recommended for reenlistment. Reenlistments by 1,400 men during the past year illustrate the early success of the "New Reenlistment Program."

Looking toward the coming year, the aim is to consolidate prior gains and to emphasize the new concept of selective recruiting, to continue meeting all quotas, and to get the maximum number of new enlisted recruits for specialized technical school training.

### Officer Procurement

The number of applications and selections for commission in some of the larger officer procurement programs during fiscal year 1957 were as follows:

	<i>Applications</i>	<i>Selections</i>
Naval Reserve Officers Training Corps (NROTC)-----	22,936	2,500
Officer Candidate Program (OCS)-----	7,590	4,870
NAVCAD/Aviation Officer Candidate (AOC)-----	4,905	3,377
Naval Academy-----	*4,700	**1,110
Officer Candidate (Merchant Marine)-----	604	528
Integration-----	1,449	228
Reserve Officer Candidate (ROC)-----	705	425
Augmentation-----	1,335	872
Limited Duty Officer (LDO)-----	1,951	631
Medical/Dental/Nurse/Chaplains/etc-----	6,706	5,610
<b>TOTAL</b> -----	<b>52,881</b>	<b>20,061</b>

\*Applicants for admission to USNA.

\*\*Applicants admitted to USNA.

Officer procurement is expected to maintain about the same pace during fiscal year 1958 that was achieved in the past year. Reduced quotas during this next year should assist in maintaining excellent selectivity.

### Training

The naval personnel training program attained its objectives in 1957. The desired end-product is sufficient trained and ready personnel to assure proper maintenance of technical equipment.

In officer postgraduate and advanced professional education, high priority has been continued in the areas of guided missiles and nuclear power. Attention has also been focused on providing better grounding for all officers in mathematics, science, and basic engineering.

The Senior Officers' Board, convened in 1956 to review the entire naval postgraduate educational program, completed its study and made recommendations which provide valuable guidance in the continued development of the Navy's postgraduate educational program. The Naval Postgraduate Educational Program has undergone sig-

nificant change during fiscal year 1957. These changes are mainly intended to reflect today's rapid technological advances.

Officers undergoing both short- and long-term school training decreased by about 3,000 from the previous fiscal year. This decrease is attributed to the reduction in curricula of officer special courses that can now be imparted by improved correspondence courses and "on the job training" which decrease training time spent away from each officer's ship or unit.

Midshipman and officer candidate training continued in the Naval Academy, the Reserve Officer Candidate Program, the Officer Candidate School, and the Reserve Officer Training Corps Program. Leadership is stressed in officer-candidate selection and training.

Enlisted training during the past fiscal year has been designed to improve technical competence. Reduced recruit input allowed better selectivity for school quotas with resultant increased quality of school graduates.

In the program for training enlisted reservists the main emphasis has been placed on practical team training and improving the quality of instructors attached to the Naval Reserve Training Centers.

Looking toward the future, the entire training establishment is being reviewed in the light of rising costs in order to consolidate existing facilities, when feasible, and to find ways to develop more and better instruction at less cost.

### **Naval Reserve**

Commencing fiscal year 1957, the Naval Reserve consisted of approximately 633,700 officers and men. This number increased to 678,700 by the end of the year. Major gains were accomplished by an increase of over 70,000 in the Active Status Pool as one-enlistment regular personnel leaving active duty transferred to the Naval Reserve to complete their 8-year obligations. A continuing increase of over 8,000 reservists was added to the active-duty group under the provisions of the Reserve Forces Act of 1955. On the other hand, continued screening of the inactive-status group reduced its strength by about 30,000 during the year.

The Organized Naval Reserve has served as a valuable source of manpower for the regular Navy. Approximately 15,000 recent recruits left this program for 2 years' active duty, in accordance with the provisions of the Armed Forces Reserve Act of 1952, as amended by the Reserve Forces Act of 1955. At the completion of this 2-year tour, these reservists will return to the Ready Reserve, many of them to their drilling units, for further training and advancement.

The Naval Air Reserve experienced steady growth in officer strength through December 1956 and a leveling trend during the remainder of the year. Implementation of the urgent Retention-Re-

call Program by the Bureau of Naval Personnel for aviators with a date of rank junior to June 1, 1953, has directly and proportionally affected the strength of the aviation units. A continued slow increase of officer strength is anticipated in fiscal year 1958.

The total active duty support ceiling, officer and enlisted, for the Naval Reserve at the end of fiscal year 1957 was approximately 19,500. The crews of nine Naval Reserve Destroyer Escorts were brought up to operating strength during the year and conducted normal training cruises for the surface reserve units. A reevaluation of the support needs of the Air Reserve resulted in the Naval Air Reserve Facility, Houston, Texas, being commissioned, and it is planned to close the Naval Air Reserve Facility, Birmingham, Alabama, next year.

### **Career Attractiveness**

Every possible action was continued during the year to improve the attractiveness of naval life and ensure that all hands were made aware of the inherent advantages of a naval career. Improved career attractiveness is obviously the most effective lever to reduce personnel turnover. It is also the key to obtaining more and better regular officers and retaining qualified young officers beyond their obligated service to fill the gaps previously noted in the 4 to 11 year group.

The Defense Advisory Committee on Professional and Technical Compensation (Cordiner Committee) completed its study of the military pay system and made recommendations for revamping pay scales to the Secretary of Defense during the fiscal year. This study recognizes the Services' need to retain trained and proficient personnel and recommended a revision of the pay scales to enhance career attractiveness. Favorable action on the Cordiner proposals would unquestionably retain quality personnel, and, over a period of 5 years, result in savings by reduction of turnover and consequent cutback in training requirements.

Active support of the Dependents' Medical Care and Survivor Benefits Bill has continued throughout the year, and both of these laws have been commendable career incentives.

Regardless, however, of increased pay (if eventually granted) and much-needed recent liberalization of various other benefits, such as those of medical care and for survivors, the best officers and petty officers (and their dependents) will remain attracted to the Service only to the extent that they are accorded the special trust and confidence which their special devotion, special responsibilities, and special capabilities merit. With increases in rank and responsibility, there must be corresponding increases in latitude of command and in the proper privileges, perquisites, and unquestioning recog-

dition, which in the past have automatically compensated for the burdens of responsibility and decision borne by the officer corps. Much can and should be done along these lines by sensible administrative action within our own household, and it is a continuing policy of the Department of the Navy to support and enhance the status of the officer corps and to afford maximum discretion to commanding officers to get their own best results untrammelled by over-supervision from on high.

### Promotion

No major changes are foreseen in the administrative procedures for processing and effecting officer promotions during the next year.

Adjustment of lineal position and promotion of active-duty Medical and Dental Corps officers which was begun during 1956 was completed during fiscal year 1957.

To provide normal promotion opportunity for Navy (and Marine Corps) officers in the so-called "hump" year groups resulting from World War II, legislation was proposed during the past fiscal year by the Department of the Navy. Since the number of these officers considerably exceeds what the numbers would be under normal conditions, more vacancies are required in the grades of captain (colonel) and commander (lieutenant colonel) in order that officers in the "hump" may not suffer unfairly excessive attrition. It was proposed to obtain such additional vacancies by requiring the early retirement of commanders twice passed over for captain, with not less than 20 years' service, and the use of continuation boards for captains with 5 years' service in grade. Officers not recommended for continuation would be retired at the end of the fiscal year in which considered.

As a means of compensating officers who are forced to retire early, it was proposed to credit them for retirement pay purposes with half the number of years by which they are retired earlier than the present law now contemplates. At the close of the fiscal year, action by Congress on this proposed legislation had commenced but was not complete.

The continuing relatively heavy turnover in enlisted personnel has necessitated that a correspondingly large number of promotions be made during fiscal year 1957. The normal Service-wide examining system has been continued with the addition of May and November quarterly examinations for advancement to third class petty officer in ratings where there is a continuing need for additional petty officers. These additional examinations permit the advancement of eligible and qualified personnel at intervals of 3 months and thus reduce fluctuations in petty officer strength.

### **Morale Services**

A necessary adjunct to the efficient administration of naval personnel is the provision of morale services. The religious welfare of all hands is an important consideration and has been emphasized as a command responsibility at all echelons.

A significant development of the past year has been a survey of dining and messing facilities throughout officer and enlisted clubs within the United States. As a result of this survey, a number of model food service facilities are being established for training mess personnel and managers of officer and enlisted clubs and messes.

During the year the Central Recreation Fund and Naval Officers' Mess Central Contingency Fund, both administered by the Chief of Naval Personnel for the Secretary of the Navy, assisted in the support of recreation and athletic programs for all hands to an amount over a million dollars. Active support of this type will continue during the coming year.

### **Personnel Research**

As a result of the Personnel Research and Development Program conducted during the fiscal year 1957, more effective and up-to-date methods and instruments were developed and put into use for the selection, classification, advancement, and distribution of enlisted and officer personnel. In addition, efforts were continued to realize maximum benefits from electronics data processing in the area of personnel coding and classification to insure proper identification and use of available training and experience.

Research in the past year was initiated to effect a major revision of the entire enlisted classification procedure to achieve assignment of the top half of the enlisted talent of the Navy to critical types of duty, particularly those resulting from recent technological developments, e. g., nuclear power, special weapons, electronics, etc. Further, an investigation is being launched into the factors influencing men to volunteer for special advanced training programs, particularly those which demand an extension of obligated service.

Some steps have been made to improve the initial selection for the NROTC program of officers who will choose to remain in the Navy beyond their obligated tours of duty. Efforts are also underway to improve officer selection procedures.

## VI. Ships

Not since the conversion from sail to steam, the incorporation of armor into warship design, and the development of breech-loading, rifled guns, has naval construction and design faced such challenges and opportunities as confront the Navy today. In a very real sense we have begun construction of a new Navy as revolutionary in 1957 as were the first four steel ships of "The New Navy" in the days of Chester A. Arthur.

Thus, in fiscal year 1957, the main efforts of the Bureau of Ships were bent toward exploiting fast-moving developments in the fields of nuclear propulsion, guided-missiles, electronics, hydrodynamics, and gas turbines. In addition, as in past years, the Bureau has continued its attempts to prolong the efficient life of now aging World War II ships which still constitute the preponderance of the Fleet.

### Aircraft Carriers

Work on the first nuclear-powered aircraft carrier has begun. Contracts have been placed for long lead-time reactor plant components and the steam propulsion machinery. Construction of the land prototype plant, being developed by the Atomic Energy Commission in cooperation with the Navy, is well underway at the Atomic Energy Commission's National Reactor Testing Station in Idaho.

After many ship-design studies in an effort to exploit the advantages conferred by the use of nuclear power, contract plans for the carrier were drawn up and signed in June 1957. Eight pressurized-water reactors will give the ship markedly greater endurance, at both low and high speeds, than conventionally powered carriers. The carriers's island will somewhat resemble a blockhouse. Forming an integral part of the island structure will be the antennae of new, more effective offensive and defensive radar. For defense, the ship will have TERRIER missile launchers in addition to its own aircraft. Funds for construction of the nuclear-powered aircraft carrier (CVAN) were requested in the 1958 program.

Progress on the *Forrestal*-class carriers is satisfying. The *Saratoga* (CVA-60) joined the Fleet, and the *Ranger* (CVA-61), nearing completion at the end of the year, is expected to be commissioned early in fiscal year 1958. Two of the remaining 3 under construction, the *Kitty Hawk* (CVA-63) and the *Constellation* (CVA-64), will mount a TERRIER surface-to-air battery rather than guns.

Modernization of the three *Midway*-class carriers is proceeding. The *Coral Sea* (CVA-43) conversion, last of the three to start, commenced in April.

The program for modernizing 15 of the World War II *Essex*-class carriers was completed during the year with but 2 exceptions—the *Oriskany* (CVA-34) and the *Lake Champlain* (CVA-39). It was determined that another carrier is needed which is capable of operating with the *Hancock*-class without restricting full deployment of the latter. Accordingly, the *Lake Champlain* conversion was deferred indefinitely, and the scope of the *Oriskany* conversion was greatly enlarged to include new arresting gear, steam catapults, installation of larger elevators with more weight capacity, enclosing the bow, and other features.

Structural changes to improve the safety and efficiency of carrier landings are continuing. Mirror deck landing systems have been applied extensively. Operational systems had been installed on two ships in fiscal year 1956. By the end of the following year, 25 systems were installed on 19 carriers. Based on operating lessons, a contract has been placed for a new, simpler, and still more compact system. It is expected that this system will be installed aboard *Forrestal*-class carriers during the next fiscal year.

The effectiveness of the mirror deck landing system has been demonstrated beyond question. Most notably, landings have been rendered far safer, particularly landings when visibility is poor and landings made by relatively inexperienced pilots. The difficulties posed by high landing speeds are greatly ameliorated. Interpretation of the mirror's signal by the pilot is so simple it almost causes a reflex action, while precious moments are lost interpreting the gestures of a landing signal officer. The end results are fewer accidents, less severe and costly accidents, and fewer fatalities and injuries.

The search for other improvement continues. Under the cooperative efforts of the Bureau of Ships and the Bureau of Aeronautics, a contractor has developed equipment capable of landing an aircraft on a carrier without the pilot touching the controls. Landings made on a runway showed a lateral deviation of only 10 feet and a longitudinal deviation of only 20 feet for 67 percent of the readings. The equipment will go aboard the carrier *Antietam* (CVA-36) for flight testing early in fiscal year 1958.

### Submarines

The last conventionally powered, twin-screw submarine in the Navy's building program, the *Darter* (SS-576), was completed during the fiscal year. Of the submarines still building, only three in the *Barbel* class (SS-580-582) are even remotely similar—and these have

the whale-like hull and single screw of the *Albacore*. This configuration, along with the most modern diesel-electric propulsion system, will give the *Barbel* class greater range, higher underwater speed, and better maneuverability than the similar *Tang* class.

There were a number of firsts during the year. After having steamed more than 60,000 miles, the *Nautilus* (SSN-571) was finally refueled. The old reactor core—the entire core, not merely the fuel elements—was removed and sent to Arco, Idaho, for examination and reclamation of the unused uranium. The replacement core incorporates important technological advances which will greatly extend fuel performance and render the core simpler, less expensive, and more reliable. The refueling was accomplished without incident, and the *Nautilus* rejoined the Fleet.

The *Seawolf* (SSN-575), first submarine with a nuclear reactor cooled by liquid sodium, was completed during the year. This radically experimental ship was undertaken because the design offered great promise for reducing the weight per shaft-horsepower and for improving plant efficiency. Some of the design problems involved in the use of liquid sodium still have not been solved, but a great deal has been learned. The submarine is operational, but is being limited in horsepower rating. The plants of all other current and planned nuclear-powered ships are cooled with pressurized water.

The Navy's first submarines built specifically as radar pickets, *Sailfish* (SSR-572) and *Salmon* (SSR-573), were completed in fiscal 1957 and joined the Fleet. The nuclear-powered radar picket submarine *Triton* (SSRN-586) is expected in the Fleet in fiscal year 1960.

Contracts for 5 of the 6 submarines in the fiscal year 1957 program, all nuclear-powered, were awarded during the year. The sixth has been earmarked for Portsmouth Naval Shipyard. Progress on the submarines now building is satisfactory.

On April 11, 1957, the keel was laid for the *Halibut* (SSGN-587), first submarine designed from the keel up to carry missiles. She, too, is expected to join the Fleet early in fiscal 1960.

Thirteen nuclear-powered submarines are now under construction, and the Navy has requested funds for 4 more submarines in the fiscal 1958 program. A substantial increase in the number of POLARIS submarines is being programmed this fiscal year to keep abreast of the encouraging speedup in the POLARIS missile program.

### **Cruisers and Destroyers**

The new destroyers in the 1956 program were designed for guns only. The designs of 3 of the 6 frigates provided originally for guns only, but guided missiles were added later. All cruisers and destroyers in the 1957 shipbuilding and conversion program are to be guided-missile ships. The progress in "missilizing" the Navy is indicated by

the fact that the guided-missile ships requested in the fiscal year 1958 program mark the final step in transition from guns to missiles as primary armament.

The first ship to have all-missile armament—the cruiser U. S. S. *Long Beach* (CGN-9)—will also be nuclear-powered. Contracts for the reactor components, the steam machinery, and the ship were placed during the year, and progress is satisfactory. The ship will be powered by two prototype water-cooled reactors based on a design to be tested by the Atomic Energy Commission at Arco, Idaho, in the summer of 1958. The basic plant is adaptable for single or multiple installation on several types of larger ships, including the nuclear-powered aircraft carrier (CVAN). The size of the *Long Beach*, about 14,000 tons and 700 feet in length, was determined as the minimum necessary to accommodate both nuclear power and the latest missiles. Search radar antennae will eventually be consolidated in an integral radar tower.

The 6 guided-missile light cruiser conversions in the 1956 and 1957 programs progressed well. Three ships will be capable of launching TERRIER missiles. The other 3 ships will be equipped to fire TALOS missiles. All 6 will retain their forward gun batteries. Toward the end of this fiscal year the decision was reached to modify the conversion of 2 TERRIER and 2 TALOS ships in the 1957 program to provide fleet flagships for the major fleet commands. All but one triple 6-inch gun turret and a twin 5-inch gun mount will be removed from the forward portion of the ships. Using the space and weight thus gained, communications capabilities will be greatly increased and much improved staff accommodations and living spaces will be provided.

The Navy requested funds for the conversion of three cruisers in the 1958 program. These will be all missile ships, capable of handling TALOS, TARTAR, and ultimately REGULUS II. Two TALOS and 2 TARTAR launchers will be installed. The profile of the ships will be unique. Jutting skyward will be two integrated mast-stacks, developed to provide effective disposal of corrosive stack gases which can seriously impair the operations and maintenance of the large numbers of topside missile guidance radars. These aluminum towers are approximately twice the conventional height of conventional stacks. They divert the gas flow over the after quarters of the ship, and have provision for increased smoke discharge velocity to insure smoke clearance under virtually all wind and steaming conditions.

Construction of all but 2 of the 10 authorized guided-missile frigates had been started by the end of the year. These ships are of similar design and have TERRIER batteries aft and guns forward. They will be used primarily to provide modern anti-aircraft defense for high-speed task forces. The guided missile frigates requested in the 1958

program will have missile launchers forward and aft, better sonar, and improved antisubmarine weapons.

The *Gyatt* (DDG-1), the Navy's first guided-missile destroyer, was completed in fiscal 1957 and joined the Fleet. Conversion of the destroyer provided her with a twin TERRIER launcher aft, the latest submarine detecting devices, modern antisubmarine ordnance, and an active roll-stabilization system, something of a novelty in the hard life of a destroyerman.

Contracts have been awarded for the eight new guided-missile destroyers in the 1957 program. Primarily equipped to launch TAR-TAR surface-to-air missiles, they are armed also with two 5"/54 single-mount rapid-fire guns and the latest antisubmarine weapons. Their hull design is an evolution of the *Forrest Sherman* (DD-931) class and they will likewise have aluminum superstructures. The most recent habitability improvements will be incorporated, including air conditioning of all living spaces.

Although the destroyer-type building program is not sufficient to replace hull for hull the large bloc of World War II destroyer-types which will go over-age simultaneously, we are continuing to improve antisubmarine warfare equipment performance. This improved performance, however, in no way lessens the requirement for numbers of destroyers. A major problem in destroyers is to increase their anti-submarine effectiveness against the greatly increased power of the weapons which may oppose them. Destroyers which were adequately armed at the end of World War II are losing their effectiveness against today's threats. Some improvements can and have been made, but space limitations prevent fully effective conversions in existing hulls.

### **Amphibious Warfare Ships, Craft, and Vehicles**

Conversion of the *Thetis Bay* (CVHA-1), the Navy's first assault helicopter carrier, was completed during the year. Altered to serve the Marine Corps' vertical envelopment concept, the ship is capable of launching large helicopters loaded with Marines and combat equipment and supplies. Able to handle approximately 20 HRS-type helicopters at present, she will soon carry larger, 15-man helicopters. Extensive modifications were made to provide accommodations for the Marine landing team and aircrews that will be carried in addition to the ship's company. The closely related conversion in the 1957 program, of a CVE-105-class carrier to an amphibious assault ship (LPH), will embody alterations similar to those performed on the *Thetis Bay*. Conversion of this ship will start during fiscal 1958.

A new (rather than converted) amphibious assault ship was requested in the fiscal 1958 budget. This ship will be faster than the CVE conversion. Habitability will be considerably better. The hangar deck will be larger, and the aviation gasoline capacity will be

larger. One of the principal advantages of this ship will be the capability of launching helicopters in a shorter time as a result of more operating positions on the flight deck. This will be the first ship to be built from the keel up to implement the Marine Corps' modern amphibious concept.

The conversion of a merchant hull to the attack transport *Paul Revere* (APA-248) started in midfiscal 1957 and proceeded well. The *Paul Revere* will be the next to last conventional attack transport to be built by the Navy, thus underscoring the rapidly approaching close of the era of old-style landing operations now being displaced by atomic-age assault techniques. It will be this ship's mission to combat load, transport, and land a Marine battalion with its essential assault equipment and then to furnish it with supplies via landing craft. These craft, which will be large, will be lowered and raised by means of heavy duty winches. A helicopter landing platform is being added aft.

Three dock landing ships (LSD) were completed during the year, bringing to a close the current building program for this type of ship. The LST-1173-class tank landing ships now building had passed the halfway mark by the end of the year.

Contracts for the ten utility landing craft in the fiscal 1956 program were awarded during the past year. These craft will have an improved underwater form and will be propelled by twin screws shrouded with Kort nozzles, which increase the thrust. Power sufficient for 11 knots sustained speed will be provided. In addition, the craft will have backing rudders for better maneuverability. The three LCU's in the fiscal 1957 program will be similar to the foregoing class, but will have unusual propulsion features.

Construction programs for LCM's, LCP(L)'s, and LCVP's were considerably curtailed during the year, in conformance with reduced operational requirements. A family of high-speed planing-hull landing craft have been designed and considerable research and development work has been done on hydrofoil landing craft.

A curtailed program for building Marine Corps landing vehicles continued. Here again, as noted above and in chapter IV, reductions in the means to accomplish conventional, World War II landings are making way for modern landings employing assault helicopters. During the year an order was placed for 14 tracked amphibious-landing vehicles (LVTR-1) in addition to 51 already completed. These vehicles are used for combat recovery and maintenance of disabled landing vehicles.

### **Mine Warfare, Patrol, Auxiliary, and Service Ships and Craft**

Magnetic minesweeping capability of the Fleet was increased by the delivery of U. S. S. *Agile* (MSO-431), U. S. S. *Acme* (MSO-

508), U. S. S. *Adroit* (MSO-509), and U. S. S. *Stalwart* (MSO-493), raising the total of active ocean minesweepers to 57.

Construction of the nonmagnetic ocean minesweepers now building progressed satisfactorily, as did the building of the coastal mine hunter *Bittern* (MHC-43), which was launched in March 1957. The last of the new minesweeping boats, MSB-29, was completed during the year. This is 1 of the 30 boats in the fiscal 1952 program. All the others had been completed by spring of 1955 as 57-foot, 30-ton boats. The MSB-29, however, is 82 feet long and displaces 65 tons.

The two inshore minesweepers (MSI-1-2) in the 1957 program are already well underway. These are prototypes of a new class of woodhulled, nonmagnetic ships designed to operate inshore in harbors and coastal waters. Diesels will drive the 112-foot ships at over 10 knots. The ships were designed for construction in quantity with the use of mass production techniques, and controls and equipment have been made as simple as possible.

Construction of new escort vessels (DE), and the program for converting older escort vessels to radar picket escorts, proceeded apace.

Contracts for the *Nitro* (AE-23) and *Pyro* (AE-24) in the fiscal 1956 program, and the *Haleakala* (AE-25) in the 1957 program, were awarded during the year. These are similar to the *Suribachi* (AE-21) and *Mauna Kea* (AE-22), which were completed during the year.

The *Compass Island* (E-AG-153) conversion was completed. This ship is to assist in the development and evaluation of a navigational system independent of shore-based aids. The key to the ultimate, all-weather, all-latitude, day-and-night capability is the Ship Inertial Navigation System (SINS). *Compass Island*, once a Mariner-class cargo ship, will be one of the most comfortable riding ships in the Navy. She has the best automatic steering available and in addition has activated fins for roll-stabilization.

Detailed plan work for the *Observation Island* (E-AG-154) got underway. This is an adaptation of a Mariner-type ship for experimental ordnance work.

Three conversions of victory-ship hulls to surveying ships (AGS) were requested for the fiscal 1958 program. These ships will conduct special hydrographic surveys.

Conversions of 4 more ocean radar station ships (YAGR) were completed during the year, bringing the number now with the Fleet to 12. Planning has commenced for 4 more in fiscal 1958. Ten patrol vessels, 5 in the 1956 program and 5 in the 1957 program, were under construction by the end of the year. These are floating classrooms for training midshipmen at the Naval Academy in seamanship and navigation. Having wood hulls, aluminum deck houses, and diesel

engines, these craft can be quickly converted for patrol duty in the event of a national emergency.

During the year installation of air propulsion and related work was completed on the *John L. Sullivan* (YAG-37). The use of air propulsion has often been successfully applied to many small craft, but has never been demonstrated aboard larger vessels, for which it might be useful due to the undesirability or impracticability of underwater propulsion. Engineering calculations clearly indicate that the system will work, but much necessary information, especially in the realm of seamanship and ship handling, can only be obtained through trials with a full-scale ship. The *John L. Sullivan* is expected to displace 14,000 tons and develop 20,000 horsepower from surplus turbo-propeller aircraft engines on 40-mm gun mounts.

The Navy maintains about 2,000 service craft to provide logistic support to the Fleet. These are waterborne, self-propelled and non-self-propelled barges, lighters, derricks, harbor tugs, floating dry-docks, and miscellaneous other special purpose craft.

The disposal rate for service craft is expected to increase because normal life of many World War II craft, especially those with wooden hulls is at or near an end. Planned new construction of service craft does not match expected attrition.

During the year 4 large tankers were completed for the Military Sea Transportation Service, and construction progressed satisfactorily on 2 special-lift ships, the *Comet*, a roll-on roll-off ship, and the *Point Barrow*, a cargo ship. In addition, 1 ice-strengthened small tanker was completed; a second small tanker and 3 small cargo ships similarly ice-strengthened for Arctic resupply lifts will be completed in fiscal year 1958. These ships are being constructed with funds provided specifically for the MSTs.

### **Mutual Defense Assistance Program (Ships)**

The various ship programs under the Mutual Defense Assistance Program (MDAP) up through the 1956 program were, with the exception of the Spanish program, over 90 percent complete by the end of fiscal 1957. The fiscal 1957 program involves about \$36,000,000 and 30 vessels, over half of which are being built in the United States. Contracts were placed for all new 1957 ships, including those being built under Offshore Procurement.

### **Fleet Maintenance**

Maintaining the active Fleet during fiscal 1957 involved the usual wide range of effort—damage repairs, provision of allowance-list items and of supplies and equipage for current operations, overhauls to accomplish normal upkeep, and accomplishment of improvements to keep the Fleet up to date.

The Navy was fortunate with regard to accidental damage during the year, having operated with unusually few breakdowns, collisions, damage from storms, or other accidents. This eventually made some funds available to help meet heavy increased costs in other areas. Even so, insufficient money remained available to make appreciable inroads in allowance-list deficiencies.

The increasing age of many ships in the active Fleet combined with spiralling costs of labor and material to render overhaul costs considerably higher than anticipated. Perhaps fortunately, 8 ships for which overhauls had originally been planned were diverted—some were converted, some were inactivated, some were delayed due to an extension in their overhaul cycle, 1 was diverted for the MDAP, and 1 for disposal. The funds made available as a result of the deletion of these ships from the active fleet overhaul schedule served to absorb the increasing cost of the remaining overhauls. As noted in Ch. III, 425 overhauls were ultimately completed.

The initial plan for improvements was curtailed several times during the year. Some money thus released went to cover the increase in requirements for, and cost of, fuel; some was used to cover the increased cost of completing the fiscal 1956 program. The revisions, coupled with increased labor, material, and overhead costs, resulted in the accomplishment of far fewer improvements than were originally planned.

Several improvements were introduced in the Reserve Fleet during the fiscal year 1957. The most significant was the service installation of cathodic protection on about one-third of the ships in the Fleet, permitting increases in the drydocking interval from 5 years up to 8 to 10 years, depending on the type of hull.

Fiscal 1957 saw the beginning of a program to combat the progressive obsolescence of Reserve Fleet ships. Ten destroyers and 19 escort vessels were given modernization overhauls during which only the most absolutely essential improvements, including communications equipment and scanning sonar, were installed. Reserve Fleet Group personnel did as much as possible of the work within their capabilities.

### **Electronics**

Fiscal 1957 saw the fruition of several improvements in electronic equipment. One accomplishment was the development of a super-power tube which not only has a peak power capability of over a megawatt but also has a statistically proven life of over 1,000-hours mean time before failure. This tube should contribute toward providing the Fleet with light-weight radars of greater capability and reliability. Great headway has been made in the development of parts and tubes which can withstand extreme environments in high-speed missiles and aircraft.

Nearing the production stage is a general-purpose air search radar which can be transported aboard helicopter for use during amphibious assaults. Successful service tests were completed of a radar system used for close-air-support of troops during all weather conditions. The system guides attack aircraft and causes bombs to drop automatically on fixed, front-line targets. Production quantities will be purchased for the Marine Corps in 1958.

The first of a series of low-frequency, long-range air-search radars, known as the SPS-17, has been operating reliably aboard ship for about a year. This radar has consistently detected air targets at ranges considerably in excess of those previously obtained. A lighter version for installation aboard ships as small as a destroyer is on order. It will have the same characteristics and capabilities.

### **Efficiencies**

Considerable savings in the Bureau of Ships resulted from increased utilization of value engineering. Those applied aboard ship during the year totaled about \$4.3 million. Since the operating costs of Bureau and field units added up to a little over \$500,000, the ratio of applied savings to operating costs worked out to approximately 8 to 1 as compared to 6 to 1 last year. A major effort during fiscal 1957 was devoted to extending the value engineering program in the private shipbuilding and equipment manufacturing plants.

A long-range training program in nuclear technology was instituted. The first phase of the program consisted of an in-service nuclear physics course. Sixty Bureau of Ships engineers were selected for this course.

The Bureau of Ships has developed a photographic system of data retrieval which make it possible mechanically to select, order, and photograph typeset data stored in a common information bank. This system has been applied to over 60 different documents, reducing production costs in each case and providing other advantages.

During the past fiscal year the Bureau operated two Univac systems at the David Taylor Model Basin's Applied Mathematics Laboratory substantially full time, and used a third of the available time on the Bureau of Ordnance's NORC computer at Dahlgren. Many important scientific and engineering problems were solved, contributing to the accelerated development of ships and weapons.

A program designed to assure continuing input and retention of engineering and scientific personnel, has been established as the Bureau of Ships—Field Activities Co-op Program for Engineering and Scientific Personnel. The student-trainees alternate between periods of engineering/science studies at college and productive work in the naval shipyard or laboratory where employed.

"Popularity Storage" was introduced at the Supply Department of one shipyard. It was discovered that much time and effort could be saved by binning fast-moving items and by posting after issue rather than preposting. Reduction in the number of warehousemen and clerks was also achieved.

The Naval Radiological Defense Laboratory introduced the supermarket technique for its shop stores operations. Material is displayed on counters and in bins. The reduced paperwork is taken care of at a central desk.

The Controlled Maintenance Program has been installed at many BuShips-managed field activities. There are indications that more maintenance work is being performed at these activities despite a general decrease in public works maintenance personnel.

## VII. Aeronautics

A significant part of the Navy's aeronautical effort during fiscal year 1957 was directed toward the development of weapons with which to combat the ever-increasing submarine threat. To coordinate and expedite these efforts, program managers were given responsibility for monitoring each weapons system from inception through retirement from Navy use, through the various stages of development, production, fleet delivery, and operation.

In support of the continued shift from guns to missiles, considerable effort was expended in developing electronic equipment for guidance of these missiles and target drones. Improved electronic equipment was also being developed during the year for navigation and communication and for the antisubmarine warfare and airborne-early-warning missions of aircraft and airships.

The aircraft inventory was significantly reduced when approximately two thousand aircraft were declared obsolete or excess to Navy needs. The fact that the number of models of aircraft was thereby reduced greatly simplified logistic support problems.

The cost of weapons increased substantially this year at the same time the budget trend was downward. The Navy, therefore, was faced with the necessity for cutting its weapons program to fit the funds available. As the year ended, in view of the fact that an even more stringent budget was in the making, some weapons systems were being curtailed and others eliminated.

Rapid developments are being made in improved equipment and lifesaving devices, to simplify the pilot's personal equipment and provide more durable materials for the construction of aircraft. Improvements in airframe design are taking place at such a rapid rate that it can almost be said that by the time an item has been perfected it is already obsolete. Work was continued to improve the full pressure suit and to provide groundlevel escape capability for all service aircraft. The titanium sheetrolling program progressed steadily during the year; initial quantities of sheet of the first alloy were becoming available for evaluation and, if satisfactory, will permit considerable improvement in airframes.

Modernization of the aeronautical shore establishment to service the new high-performance aircraft made some progress during the year, but has not kept up with aircraft developments. Due to increased operational activity, four new stations were established during the year.

## Aeronautic Achievements

The A3D-1 Skywarrior, twin-jet attack bomber and the largest and most powerful aircraft ever to operate from a carrier deck, broke two speed records in March 1957, and at year-end held the official east to west record of 5 hours, 13 minutes, and 49 seconds, and the round trip cross-country speed record of 9 hours, 13 minutes, and 4 seconds.

A naval officer, Lt. Comdr. Morton L. Lewis, won the William Parsons Award for Scientific and Technical Progress. In August and November of 1956, Lieutenant Commander Lewis and Mr. Malcolm D. Ross of the Office of Naval Research (also a recipient of the award) attained a height of 76,000 feet with a balloon carrying a pressurized, spherical aluminum gondola, thus demonstrating that a low-cost, zero-velocity manned platform could be placed in the stratosphere. Lieutenant Commander Lewis and Mr. Ross will receive the Harmon International Trophy (Aeronaut) for outstanding achievement in the lighter-than-air field.

The HR2S-1, Marine assault helicopter initially accepted by the Bureau of Aeronautics during fiscal 1956, was undergoing trials as the year ended. As a result, three world's records were established by Maj. Roy L. Anderson, USMC, on 9-10 November, 1956. These were:—

Maximum speed.....	162.7 mph.
Maximum payload (to an altitude of at least 6,500 feet).	13,260 pounds to 7,000 feet.
Payload of 5 metric tons to maximum altitude---	11,050 pounds to 12,100 feet.

During 1957, carrier photographic planes were for the first time being flown off carriers at night to do night photographic work. Night photography has improved immensely in technique in the last few years, but development in technique is still necessary before night photography will be on a par with daytime reconnaissance missions.

The growth of the Soviet submarine threat and the need for long-range warning of approaching aircraft over the vulnerable northeast and northwest approaches to the United States have increased the value of the airship to naval operations. In March 1957, a ZPG-2 airship established new distance and endurance records in a nonstop, nonrefueled flight from the United States to Europe, Africa, and back to the United States. This flight, which originated at the Naval Air Development Unit, South Weymouth, Massachusetts, on March 4, 1957 and ended on March 15 at the Naval Air Station, Key West, broke the nonrefueled aircraft endurance record by remaining aloft 264 hours, 14 minutes and 8 seconds. On this trip the ZPG-2 covered a distance of 8,216 miles, thereby breaking the unofficial *Graf Zeppelin* record of 6,980 miles.

During the winter of 1956-57, evaluation of all-weather capabilities of airships was successfully completed at Naval Air Development Unit, South Weymouth, demonstrating that these airships can operate in snow, sleet, freezing rain, high winds, and dense fog. Between January 15 and 25, 1957, the Naval Air Development Unit and Airship Airborne-Early-Warning Squadron One successfully conducted a joint all-weather barrier exercise and maintained a round-the-clock 10-day watch over a selected North Atlantic Ocean area. For 10 days, working as a team, these airships maintained uninterrupted radar control in spite of weather which included a 37-hour blizzard, severe icing conditions, and long spells of "zero-zero" visibility over seas whipped by 60-miles per hour winds—thus establishing a weather endurance record unparalleled in the history of flight.

### Procurement

The policy of modernizing naval aviation by replacing older models with new, higher-performing models continued. Because of increasing cost, however, the number of aircraft procured with 1957 funds was 300 less than in the 1956 program. Three new models, the A3J-1, F8U-3, and WF-2, were funded in 1957; small numbers of the F8U-1 and 1 new helicopter, the HUK-1, were introduced. In addition, preproduction development work, using production funds, was initiated for 3 new models planned for procurement in the fiscal year 1958 program. Seventy percent of the aircraft in the fiscal year 1957 program were combat types, 18 percent were trainers, and 12 percent were utility types.

The engine procurement program for fiscal year 1957 was composed of approximately 29 percent reciprocating and 71 percent jet engines. The total number obtained was approximately 4 percent less than for the previous year.

With smaller quantities of aircraft being ordered, the trend is to slow down and stretch out current production and attain a level-off rate of completions. As a result of these processes, the aircraft manufactured for Navy use during fiscal 1957 were 290 less than the previous year.

### Terminations

A total of 217 aircraft on contract were terminated this year prior to construction. Included were quantities of the F11F-1, F5D-1, P6M-2, A4D-3, and T2V-1. The F11F-1 program, which was cut down by 117 aircraft in 1956, was further curtailed because of continuing delays in the airframe construction and problems relating to the J65 engine. The F5D-1 program was cut back to a test quantity because of extensive delays in development and related production

slippage. In addition, other improved all-weather fighters coming into production promised to meet the requirement more promptly.

Increasing prices and extensive changes considered necessary for the P6M-2 made it advisable to reduce the quantity of this model to keep within budgeted funds. Increasing costs and budget limitations brought about a decision to suspend the A4D-3 program, which was in an early stage of development. The T2V-1 program reduction stemmed from a requirement for a high-performing jet trainer and substitution of the F9F-8T.

The SPARROW I air-to-air missile production program with Sperry Farragut Company was completed with delivery of the last missile on April 12, 1957. There are no SPARROW I missiles programmed for fiscal year 1958. The Naval Industrial Reserve Aircraft Plant facilities at Bristol, Tennessee, used in the production of SPARROW I missiles, have been turned over to Raytheon Manufacturing Company (Missiles Division) for the production of the SPARROW III components.

### **Maintenance**

The study made by Ford, Bacon and Davis, Inc., of the adequacy of aircraft overhaul and repair facilities as they are related to present and future requirements was completed early in the fiscal year. As a result of this study, the Bureau of Aeronautics established during the year a long-range master workload plan and a long-range facilities plan to modernize, augment and/or replace facilities for the overhaul and repair of naval aircraft.

In line with the Department of Defense policy regarding the use of commercial facilities, and because of lack of Navy capacity to accomplish the work, the Navy is continuing to place larger amounts of maintenance and overhaul work with commercial firms. Such placements are being made especially in the early stages of aircraft development before Service personnel have acquired the know-how to overhaul the increasingly complex new aircraft models.

The cost of filling the engine-supply pipeline—that is, engines in shipment to field activities, overhaul, and repair—has steadily increased. Based on present price trends of new engines, "pipeline" cost is expected to double in the next few years. Means which have been explored for reducing "pipeline" requirements include air shipment of engines to reduce transportation time, improved overhaul scheduling, and, most effective, expanding the extent of repair which can be performed by field maintenance activities such as Fleet Air Support Squadrons. Further development along these lines will place the Navy closer to the point where jets can be supported entirely in the field, with only the major components being returned to an overhaul and repair activity for reconditioning.

Jet engine damage, due to intake of foreign objects, is now costing about \$6,000,000 a year. Many types of runway cleaning equipment have been tried, but not until recently has one been developed which will do an adequate job. This equipment, an airfield vacuum cleaner which can pick up rocks 2 inches in diameter, steel cylinders 1 inch in diameter and 3 inches long, sand, driftwood, rags and other debris, can sweep a swath 8 feet wide at 25 miles per hour and is designed to clean up to 1,000,000 square feet an hour. If the cleaner accomplishes its intended purpose, every naval air activity operating jet aircraft will be supplied with one of these units.

### **Aerology**

The Bureau of Aeronautics is responsible for Navy aerological equipment. To accomplish this responsibility, the Bureau works with the Naval Research Laboratory, other military weather services, and the U. S. Weather Bureau, and carries out applied research programs and special projects on operational aerological problems. The 14 Fleet Weather Centrals throughout the world provide aerological services for air, surface, and sub-surface operations of the U. S. Navy and oceanographic information to the armed Services.

Navy "Weathervision" service, an innovation, was inaugurated in May 1957 between the Fleet Weather Central at Suitland, Maryland, and the Chief of Naval Operation's Chart Room at the Pentagon. "Weathervision" uses television to transmit weather maps, charts, and other pictorial displays, accompanied by detailed briefing over a two-way voice channel. The system permits rapid and complete dissemination of weather information by the analysis center (station aerologist) directly to pilots' ready rooms, operations offices, outlying fields, staff offices, and other users.

The Bureau of Aeronautics and Bureau of Ordnance participated in a joint project this year to develop the High Altitude Sounding Projectile (HASP) which is expected to provide wind data to heights of approximately 20 miles above the earth's surface. The device consists of a LOKI Meteorological Sounding Rocket, the nose of which contains radar-reflective material. The rocket can be fired from a 5-inch gun and achieve maximum altitude in less than 2 minutes. At the top of its trajectory, the radar-reflective material is ejected and tracked by surface radars to obtain speed and direction at various levels.

Through close cooperation with the U. S. Weather Bureau, maximum use of weather radar has become feasible during this fiscal year. This program uses the storm-detection radar located at a station operated by one of the Services as the source of information for other stations in the same general area. The radarscope presentation is transmitted to the receiving station or stations, and provides up-to-

the-minute weather data within a large area from a single radar installation. The cost of an average weather radar is sufficient to pay for the auxiliary equipment and telephone lines for several satellite weather radar stations for a period of several years. In addition, there is a great reduction in maintenance as compared to that required for individual radar installations.

In a joint project with the Naval Research Laboratory, the Bureau of Aeronautics is establishing a five-station network to make atmospheric electricity measurements. Preliminary investigation has indicated great promise of correlating these measurements with the formation and dissipation of fog. It is anticipated that this new technique will substantially improve the forecasts of landing conditions for today's high-speed aircraft.

### **Naval Aviation Safety**

Success of the Naval Aviation Safety Program is reflected in the continuing downward trend of the major aircraft accident rate from 5.5 accidents per 10,000 flight hours in fiscal year 1952 to a record low of 3.06 in fiscal year 1957. This success is attributed largely to emphasis on command responsibility for accident prevention, resulting in better education and supervision at the operating level. The Naval Aviation Safety Center (NASC) at Norfolk has also provided major contributions. The importance of the program has been emphasized by the recent assignment of a flag officer as Director and by increases in military and civilian personnel at the Safety Center.

Conversion of aircraft carriers to the angled-deck configuration, plus incorporation of the mirror landing system, also resulted in a major breakthrough for aviation safety. The major carrier-landing accident rate per 1,000 carrier landings has dropped from 1.8 in fiscal 1956 to an estimated 1.0 in fiscal 1957.

*Approach* magazine, published monthly by the NASC, has won widespread and enthusiastic acceptance by Fleet personnel and, through this medium, current problems receive immediate attention.

Increasing numbers of experienced aviator graduates of the Naval Aviation Safety Officer course at USC are being assigned to Fleet staffs and operating squadrons. These specially trained pilots, with primary duty as aviation safety officers, are making a real contribution to the downward trend in accident rates.

One problem, unintentional wheels-up landing, showed major improvement as a result of efforts to provide better warning equipment and education of operating personnel. That type of accident was reduced by 33 percent from 76 in 1956 to only 43 in 1957.

Improved performance of current Fleet aircraft has been accompanied by increased complexity in both operations and maintenance.

These factors are also reflected in the increase in relative severity of damage resulting from an accident. Cost of major accidents, in terms of aircraft damage only, increased from \$150,000 per accident in fiscal year 1956 to an estimated \$222,000 per accident in fiscal year 1957. Although the number of major accidents in 1957 decreased by more than 10 percent, numbers of aircraft destroyed rose from 572 in 1956 to 609 in 1957, an increase of 6 percent. Accident costs in 1957 are estimated at more than \$287 million, an increase of more than 26 percent over the \$227 million cost in 1956.

## VIII. Ordnance

New and improved missiles, rockets, torpedoes, mines, and bombs were introduced in the United States Fleet or were well advanced in development during the fiscal year. By way of comparison it will be noted that guns are not mentioned in the foregoing sentence. Guns are no longer under development by the Navy, and those on hand will suffice for the years that remain.

### Missiles

TERRIER, the Navy's first surface-to-air guided missile, described in last year's report, is now operational in the guided-missile cruisers *Boston* and *Canberra*, and is approaching fleet evaluation in the first guided-missile destroyer, the U. S. S. *Gyatt* (DDG-1). A number of additional ships, now in the process of building or conversion, were earmarked this year to mount the TERRIER. Among these will be the first nuclear-powered cruiser, the *Long Beach*. Improved versions of TERRIER, however, are already being developed, and will in due course further increase the air-defense capabilities of TERRIER-carrying cruisers.

Flight testing of the long-range surface-to-air ramjet TALOS continued to demonstrate the missile's outstanding effectiveness, high reliability, and accuracy, even at its longest range. Because of this reliability, the Navy is making the first shipboard installation of TALOS in a modern cruiser, U. S. S. *Galveston* (CLG-3), without the intervening steps of evaluation installations in experimental ships like the *Norton Sound* or *Mississippi*. The cruisers *Little Rock* and *Oklahoma City*, and the nuclear-powered *Long Beach*, will also be armed with TALOS. TALOS missiles can be fitted with either nuclear or high explosive warheads. In addition to its primary anti-aircraft capability, TALOS can be used against surface or short targets, thus increasing the offensive power and range of TALOS ships.

The flight testing program for TARTAR, the Navy's newest surface-to-air guided missile, proceeded satisfactorily. TARTAR is a more compact missile than TERRIER or TALOS, and is designed for destroyer main batteries and secondary batteries of larger ships. Deliveries of TALOS and TERRIER fire-control equipment have started, and TARTAR equipment is under contract. All items have major changes ordered or planned in order to accommodate the steady improvement of the missiles.

Quantity production of the air-to-air SIDEWINDER, an infrared, heat-seeking guided missile, is proceeding. The establishment of an alternate production source saved the Government approximately \$13,000,000. As production of SIDEWINDER progressed, minor changes were incorporated which resulted in improvements over early models, including an appreciable increase in high-altitude range. SIDEWINDER provides the Fleet with a rugged, inexpensive weapon capable of operating against high-performance aircraft. Navy attack squadrons equipped with SIDEWINDER were deployed on most attack aircraft carriers (CVA). A substantial number of Marine air squadrons are also equipped with the missile. SIDEWINDER is today probably the most widely used guided missile in the world. Noteworthy in connection with the success of the SIDEWINDER was the incentive award of \$25,000—largest ever given to a U. S. Government employee—to Dr. W. B. McLean, a Bureau of Ordnance scientist, for his leadership in development of the missile.

The BULLPUP missile, an air-to-surface missile under development during the year, is in production. Like SIDEWINDER, BULLPUP represents another step toward the compactness, economy, and effectiveness which are necessary in naval weapons. It is about 11 feet long and weighs less than 600 pounds. BULLPUP is designed for use against small targets, pillboxes, tanks, truck convoys, bridges, and railroads. The U. S. Air Force is buying evaluation quantities of the weapon.

The REGULUS II, surface-to-surface missile, made test flights during the year. REGULUS II, supersonic successor of REGULUS I, will be used on the ships capable of handling REGULUS I. Its test experience has set new records in reliability and performance. To date, REGULUS II has surpassed design criteria, and is hoped to be in the Fleet far ahead of the time scheduled.

### **Fleet Ballistic Missile Program**

Development of the Fleet Ballistic Missile system enjoys top priority in the Navy and is its largest development program. In December 1956 the Navy was assigned responsibility for the new, smaller, solid-propellant ballistic missile, POLARIS, which will be especially designed for submarine use, but which will also be suitable for surface ship and shore-based employment. The system, when completed and operational, will meet the following Navy requirements: (1) capability for reaching, with relative accuracy and effectiveness, most of the important targets of the world; (2) low vulnerability of the launching platform and weapon; (3) fast reaction time; (4) capability for complicating an enemy's intelligence and defense problems; (5) minimum requirements for collateral defense structure, equipment, and person-

nel; (6) controllable by the United States; and (7) relatively unobtrusive and politically inoffensive when deployed.

In proceeding with the POLARIS development, the Navy took a deliberate approach designed to yield a POLARIS submarine capability in 1963. This initial approach has been fruitful and has resulted in the passage of many developmental milestones sooner than anticipated. As a result, by November 1956 it became clear that the POLARIS program could be accelerated to provide a capability in 1960. Accordingly, in December 1956 the program was reoriented toward the goal of completing the first POLARIS submarine system in 1960.

### Rockets and Guns

ZUNI, a new 5-inch, high-velocity aircraft rocket, was approved for use in high-performance aircraft for both air-to-air and air-to-ground attack. Designed to replace the World War II HVAR, ZUNI has almost twice the velocity of the HVAR, and its folding fins permit a plane to carry four times the former number of rounds. The ZUNI launcher, which holds four rockets, is used for transporting and storing the rocket, as well as launching it.

Installations of 5"/54 dual-purpose, rapid-fire single gun mounts have been made in *Forrestal*-class carriers, *Forrest Sherman*-class destroyers, and *Mitscher*-class frigates. The 5"/54 gun mounts are also scheduled for installation in the new TARTAR guided-missile destroyers. This gun is the last rapid-fire, dual-purpose gun that the Bureau of Ordnance has developed or has in production.

New 3"/70 dual-purpose, rapid-fire twin mounts have been installed in the *Northampton* (CLC-1), *Norfolk* (DL-1), *Carpenter* (DDE-825), *Owens* (DDE-827), and *Mitscher*-class frigates. Two mounts were installed at the Naval Training Station, Great Lakes, Illinois, for training of maintenance personnel. The production and installation program for the 3"/70 has been completed.

### Underwater Weapons

The Bureau of Ordnance, together with the Naval Ordnance Laboratory, White Oak, Maryland, placed in production this year, for evaluation, an improved underwater atomic weapon.

Test results on two new aircraft-launched antisubmarine weapons with major improvements in attack capability were highly successful. A third air-launched weapon, with the characteristics needed to defeat the higher-performance submarine of the future, reached successful completion of its research phase.

Satisfactory progress was achieved on two new surface-fired anti-submarine weapons. It is expected that these new weapons will reach far greater depths and distances than has been possible in the past.

A program to develop a new submarine-fired antisubmarine weapon with greater kill probability was initiated. A new submarine-fired antisubmarine homing torpedo successfully passed fleet evaluation tests and was recommended for service use.

Five underwater mines were successfully tested by the Fleet, and 3 were accepted for service use. These mines represent a major improvement over existing mines and possess a considerably greater anti-submarine warfare capability.

Information obtained from fleet service mine tests indicated that stockpile mines now in storage present no serious problems.

In mine countermeasures, degaussing coil designs were developed for a number of new United States and foreign vessels.

The underwater fire control capability of both surface ships and submarines was improved considerably by installation of more modern and efficient equipment.

## *IX. Medicine and Surgery*

The Navy's medical program has been handicapped—like many other Navy programs during the past fiscal year—by reductions in people and money thought necessary to accomplish its objectives. There has, however, been no diminution in the extent, difficulty, or importance of those objectives, and the inching up of prices has made it impossible to buy as much medical and dental care per dollar as in past year. Simultaneously the complexity of medical care has increased. It now demands more elaborate diagnostic procedures, new and more expensive antibiotics, and additional specialized training of personnel, all of which add to the cost of medical service.

New military medical problems have been created by the introduction of super-speed planes, the use of nuclear power to propel ships, and the development of missiles to enhance firepower. The Medical Department is concerned with the physical adjustment of fighting men to these new weapons and devices and the influence of these devices on the health of people who operate them.

### **Health of the Navy**

During a typical day in the past year, slightly less than 13 out of every 1,000 members of the Navy and Marine Corps were absent from duty because of an incapacitating illness or injury. The invalidating rate fell to 11.9 per 1,000 and the death rate to 1.8 per 1,000. However, the overall incidence rate for diseases and injuries rose slightly above the 373 per 1,000 for 1956 owing to an influenza outbreak late in the year. The rate for acute respiratory infections during most months was lower than during the previous year.

Up to June 30, 1957, the influenza outbreak affected about 10,000 personnel. Cases were mild and of short duration, and only a small proportion had to be hospitalized. Steps to vaccinate all hands against the disease were underway by the fiscal year's end. During the first part of fiscal year 1958, however, there was a large increase in influenza cases, but preventive measures were so effective that the outbreaks were controlled, and, even at its peak, no ship was incapacitated.

The incidence of other diseases of major interest, such as venereal disease and mental, psychoneurotic, and personality disorders, was not significantly different from that of the previous year. During the past year, of every 1,000 active-duty personnel, 50 contracted a venereal disease, not including nongonococcal urethritis which occurred at the rate of about 17 per 1,000. These diseases now add very little

to the noneffective rate since over 90 percent are treated on an outpatient basis. Mental, psychoneurotic, and personality disorders—still one of the leading causes of noneffectiveness—were diagnosed in about 14 of every 1,000 personnel as compared to 13.6 per 1,000 in fiscal year 1956.

The estimated manpower loss due to invalidings was about 10,500, compared to 12,200 for the 1956 fiscal year.

Of the approximately 1,550 deaths, injuries and poisonings accounted for 85 percent. The spotlight is still focused on the major losses due to motor vehicle accidents (510) and aviation (375), even though slight improvements were noted.

On a typical day during fiscal year 1957 about 10,500 Navy and Marine Corps personnel were occupying beds in a naval medical facility either ashore or afloat, and 700 were hospitalized in nonnaval medical facilities. In addition, about 20,000 outpatients were treated daily. The latter figure does not include physical examinations and immunizations.

### Medical Administration

A hospital administration division was established in the Bureau of Medicine and Surgery with a view to developing improved medical administrative practices devoted to the best interests of the patient. Further progress was made in the use of central dictating and transcribing systems at hospitals to save time spent by doctors in writing medical records. Hospital operations were adjusted to conform to the recently raised standards of the Joint Committee on Accreditation of Hospitals of the American Medical Association.

To the maximum feasible degree cross-utilization of facilities was sought, planning to this end being effected with the other Services. For example, patients at the Army's Fort Hamilton are now hospitalized at the Navy's St. Albans Hospital (New York), and the Fort Hamilton Hospital was reduced to a dispensary.

"Medicare," a system of providing specified types of medical care to dependents of naval personnel in civilian institutions (in addition to that given in military facilities), was instituted in December 1956. Dependents who had previously been unable to obtain care in military facilities were thus accommodated. Care for dependents in military medical facilities provides a more balanced clinical service, resulting in overall improvement in patient care. This in turn brings about higher quality of care for active-duty personnel, more efficient employment of medical personnel and facilities, and the maintenance of better medical readiness for future emergency.

The Medical Department cultivated relations with civilian medical men here and abroad and with foreign governmental medical rep-

representatives. Emphasis was on active participation, as by delivery of scientific papers in civilian medical meetings, rather than on expensive attendance at conventions, etc., of relatively large numbers of medical officers. Over 111 presentations of scientific medical and dental exhibits which demonstrate the professional work carried on in the Medical Department were given during the year.

Since the year was one of increasing financial austerity, most money had to be spent for matters directly related to patient care and other functions, such as maintenance, suffered. At year's end, there existed a maintenance backlog of \$45 million in work which should be accomplished, but is beyond the capacity of station forces or funds.

### **Medical Facilities and Logistics**

There were 262 naval medical facilities with 18,496 authorized operating beds as of June 30, 1957. Periodic adjustments in the number authorized were made to achieve the optimum 80 percent occupancy rate.

A new hospital of 100 beds, expandible to 120 beds, was completed and commissioned at Guantanamo Bay, Cuba. A new 1,000-bed unit to replace temporary construction was added to the San Diego hospital. Contracts were awarded for construction of two new 800/1,500-bed hospitals at Portsmouth, Virginia, and Great Lakes, Illinois. A new building and reactor (atomic medical) were approved for the National Naval Medical Center, Bethesda, Maryland.

The Single Manager system for procuring and distributing medical material to the wholesale depot level began operation on January 1, 1957.

### **Military Medical Programs**

Numerous advances have been achieved in aviation, submarine, and preventive medicine, and in medical and dental research. Personnel operating close to jet aircraft on the flight decks of carriers were fitted with helmets to prevent deafness; built-in midget individual radio receivers to permit communication amidst intense jet noise are under study. Fitting and use of the aviation full pressure suit was begun. This suit creates at 35,000 feet altitude an artificial environment for the pilot corresponding to that at sea level. Specifications were changed to insure added safety of aircraft ejection seats. The new integrated parachute harness which incorporates the parachute harness, shoulder harness, and lap belt was distributed; by combination fittings, all these items are integrated into a garment which gives superior safety to the pilot in crash and escape situations.

Increased attention was given to the medical study of pathological evidence in aircraft accidents. Pilot error is believed to be an impor-

tant cause of these accidents, the rate of which is still too high, despite progress that has been made.

In the field of submarine medicine, the number of career officers increased encouragingly, and medical training for service aboard nuclear-powered underwater craft advanced. Twenty-three of the 29 billets which logically should be filled by fully qualified submarine medical officers were so filled as of June 30, 1957.

There were 316 medical officers assigned in amphibious and Marine Corps field medicine at the end of the year. All medical officers and hospital corpsmen ordered to Marine Corps units were given the 1-month course in field medicine at either Camp Lejeune or Camp Pendleton.

The program in neuropsychiatry had an adequate number of psychiatrists, neurologists, and psychologists owing chiefly to the fact that a relatively large portion of drafted doctors had training in the former field. There are still shortages of senior psychiatrists with adequate professional as well as naval backgrounds. New psychiatric billets were established at a few points so that more cases could be handled on a preventive outpatient basis. Plans were completed to conduct an extensive psychiatric and psychological evaluation of DEEP FREEZE personnel assigned to the Antarctic expedition.

Preventive medicine units were active on many fronts. For example, penicillin prophylaxis reduced the incidence of rheumatic fever at the Bainbridge and Great Lakes Naval Training Centers to a significant degree, compared to the rates in previous periods. Streptococcal infections were likewise reduced. Preventive Medicine Unit No. 7 was established at Naples, Italy, to provide special services to Fleet units in the Mediterranean.

The Bureau of Medicine and Surgery worked with the Applied Physics Laboratory of Johns Hopkins University on problems posed by the use of toxic fuels in certain missiles. This required shipboard studies of TERRIER missile systems aboard two cruisers and a destroyer.

A program to study preservation, storage, and clinical use of red blood cells preserved in glycerine was set up at Chelsea hospital. Study of the preservation of whole blood by rapid freezing in liquid nitrogen was continued. These techniques are needed to make blood available to treat mass casualties.

### **Medical and Dental Personnel**

At the end of the fiscal year, 39 percent of the 3,519 medical officers (the highest percentage in several years) and 52 percent of the 1,796 dental officers (an alltime high) were regular career officers. The previous high rate of resignations among career officers was checked

and reversed by increased accessions to the regular corps. Losses by resignation had been 11 times the number of gains to the regular Medical Corps, but last year's 347 gains to 38 resignations completely inverted the trend. This extremely encouraging change may be attributed mainly to the Career Incentives Act implemented in 1956-57. This act, which effected a more favorable lineal position of staff corps officers relative to line officers and also effected better promotion opportunities in some cases, and the availability of residency training in the Navy, constituted the most effective inducements for younger physicians to join the regular Navy in increasing numbers.

The reenlistment rate for hospital corpsmen improved from 38.7 percent in the previous year to 53.9 percent in the first 9 months of fiscal year 1957.

### **Training**

The objectives of the intern and residency training programs for Navy medical officers are three-fold.

First, to produce well-trained specialists who will care for members of the Navy and Marine Corps and their families. Secondly, to procure regular medical officers for a career in the Navy. Third, to provide highly specialized care in certain naval hospitals designated as special treatment centers.

To accomplish these objectives the residency training program has been expanded from 250 residencies to 430. These include training in 16 different specialties in eight naval hospitals. A total of 80 separate training programs are now operating and are approved by the American Boards and the American Medical Association.

Fourteen naval hospitals are approved for internship training.

The success of the program of more and better training for medical officers is evident. The number of certified specialist medical officers is steadily increasing, and the medical care available in Navy facilities is better than before.

Over 90 percent of regular Navy applications are accompanied by requests for professional training. At present all officers entering residency training must have been accepted in the regular Corps.

Over 90 percent of all training in clinical medicine is done in naval hospitals, providing stimulation to the staff and resulting in better care for the patient.

While in past years the 250 residencies were never filled, this year the increased number of 430 will be filled, and many applicants cannot be accepted.

In postgraduate training increased emphasis has been placed on ABC Warfare and the management of mass casualties. The number

of Medical Department personnel given this training has been markedly increased, new courses have been established, and the training program of enlisted men has been revised to include new material in these fields.

The training of nonmedical personnel in first aid has been given considerable study and new emphasis, and new medical technician schools have been established to meet the requirements of increased specialization in clinical medicine.

## **X. Supply**

Fiscal year 1957 marked the tenth anniversary of the Navy Supply System. The soundness of the system is reflected in its responsiveness to technological developments throughout all fields of naval warfare. Broadly, the unity of the Navy Supply System has been furthered by centralizing inventory management of virtually all susceptible Navy stocks. In addition to improving the effectiveness of fleet support, the continuing trend to shift inventory control from technical bureaus to the Bureau of Supplies and Accounts Supply Demand Control Points (SDCP) has removed a heavy workload from the entire Navy Department.

Interservice supply support, interservice cooperation in procurement, and the adaptation of supply programs, where appropriate, to the Single Manager concept have proven fruitful in strengthening the Navy Supply System.

The exploitation of modern research techniques, the extension of mobile supply support, and major test projects such as FASTLANT (Fleet Air Support Test, Atlantic) have enabled supply methods to keep abreast of the Fleet. The introduction of new business and industrial management methods, such as automatic data processing and rapid communication systems, have also opened new possibilities for effective, responsive performance in the major functional areas of Navy supply.

### **Interservice Supply Support**

Considerable progress has been made in Interservice Supply Support since its adoption by the Services in December 1955. During fiscal year 1957, 15 new Commodity Coordination Groups were formed, thus bringing within the system approximately 55 percent of all military cataloged items. Twelve additional Groups have been chartered—11 in the aviation field and 1 for internal combustion engines and repair parts. With the chartering of these Groups, approximately 90 percent of all military cataloged items will be covered in the Interservice Supply Support Program.

The Interservice Supply Support Committee Records Office was established on January 1, 1957. This office is under the administrative control of the Navy and policy control of the Interservice Supply Support Committee (ISSC). It performs such administrative functions for the ISSC as preparation of reports, compilation of statistics, and monitoring of participation of inventory managers in the program.

### **Single Manager Programs**

Transition to the Single Manager Plan for the management of petroleum products, medical material, subsistence, and clothing and textiles was virtually completed during this year.

In line with the designation of the Secretary of the Navy as Single Manager for Petroleum, the Military Petroleum Supply Agency (MPSA) was established August 29, 1956. Similarly, the Military Medical Supply Agency was activated, under the management control of the Navy, on January 2, 1957 as the Single Manager agency for medical and dental supplies. The Navy Medical and Dental Supply Office was disestablished, and the responsibility for control of Navy retail stocks was assigned to the Navy Medical Material Office.

Transition to Single Manager for Subsistence operations was completed in July 1956. Following disestablishment of the Provisions Supply Office, the Navy Subsistence Office was established to coordinate the Navy retail subsistence system, provide for Navy representation with the Single Manager for Subsistence, and perform mess management functions for the Navy.

The transition to Single Manager for Clothing and Textiles was completed on June 30, 1957. Concurrently with disestablishment of the Clothing Supply Office, the Navy Clothing and Textile Office was established to administer the Navy retail clothing distribution system.

### **Cataloging**

Of all items in the Navy Supply System more than half were converted to Federal stock numbers during the past year. This brings the total to date to 60 percent. The largest area of conversion consisted of Navy aeronautical items. By the end of this fiscal year, 172,000 Marine Corps items were converted to Federal catalog data, or approximately 84 percent of the total Marine Corps program.

### **Material Disposal and Redistribution**

Approximately \$1.5 billion's worth of property (acquisition cost) was disposed of during the past year. 1,625 obsolete military aircraft were sold. Similarly, disposal of 59 vessels was accomplished. Of the \$1.5 billion excess property reported to the Bureau of Supplies and Accounts by the Services during the first 9 months of fiscal year 1957, about \$85 million was redistributed among various agencies.

### **Inventory Control**

As part of the drive to improve inventory management, on-site examinations and analyses of operating methods were conducted at

six Supply Demand Control Points (SDCP's). Based on these examinations, 133 recommendations primarily directed toward the improvement of policy development, methods, and procedures in the planning, stock control, and financial control areas were approved. Stock positioning, distribution patterns, levels for peacetime and mobilization stocks, requirements determination, and requirements satisfaction were the principal areas of concentration. The recommendations have in turn prompted test studies or the actual implementation of new or improved methods, techniques, and systems.

SDCP requirements for automatic data-processing equipment were further analyzed as part of the program for progressive installation of such equipment. During fiscal year 1957 automatic data processing equipment was installed at the Ships Parts Control Center, and approval was obtained for the installation of initial or additional equipment at five other SDCP's. These installations will reduce the time required to analyze inventories and expedite determination of requirements.

Transaction reporting, facilitated by automatic data processing, provides the inventory manager with current Master Inventory Records instead of records conventionally posted each quarter. This improved method of stock reporting was also inaugurated at the Ships Parts Control Center coincident with the installation of automatic data processing equipment.

In addition to studying various automatic data processing applications, a tranceiver network between major naval air stations and the Aviation Supply Office, Bureau of Supplies and Accounts, was installed to permit rapid transmission of stock status and requirements information. Transceivers, or their equivalents, may permit the introduction of additional planning factors into the replenishment formulae and reduce the time required to analyze inventories and develop planned requirements. Studies for the application of rapid communications networks between other stock points and inventory control points are continuing.

The Ships Parts Control Center (SPCC) was designated in fiscal year 1956 to maintain all Bureau of Ships allowance lists for surface vessels. The transfer of this function from the shipyards continued throughout fiscal year 1957, and 1,751 allowance lists are now under SPCC maintenance. Upon completion of the transfer, anticipated by April 1, 1958, SPCC will be responsible for developing and preparing 3,300 allowance lists. One major advantage of this consolidation of the maintenance and preparation function is that it enables SPCC to purify the old Revised Individual Allowance Lists before preparation of the new Shipboard Allowance

Lists. This review will also eliminate duplications resulting from maintenance by the separate shipyards. For example, it is anticipated that the number of pages maintained for Individual Allowance Parts List will be reduced from some 4,000,000 pages to about 70,000 pages for the new Shipboard Allowance Parts Lists.

### **Development**

The Bureau of Supplies and Accounts continued to work with the Office of Naval Research in developing wool and synthetic fiber blends which would reduce wool requirements in the event of emergency. Fabrics for absorption and neutralization of chemical agents and reduction of thermal radiation hazards are also under development. A special research project conducted in conjunction with Operation DEEP FREEZE in Antarctica tested Navy cold-weather clothing. These tests proved that properly protected personnel can live and work in the coldest climates in the world.

Cargo movement aboard ship was accelerated through more use of conveyors and materials handling equipment.

Extensive mechanization of warehousing, receiving, shipping, and related supply functions is under study with a view toward incorporating the principles of automation.

Testing of new compressed foods of increased density (to reduce storage requirements) has led to development of subsistence loads for ships, which will provide the necessary food for long cruises yet satisfy consumers. Surveys of Navy and commercial feeding establishments, coupled with industrial engineering studies, have indicated means of reducing manpower requirements in messing operations. Improved commissary facilities and galley layout plans aboard ship have resulted in more efficient food preparation and service.

### **Future Supply Objectives**

The Bureau of Supplies and Accounts is working to better the Navy Supply System by—

Improving forecasts of usage rates in order accurately to predict requirements and rapidly translate new military programs into consumption rates for parts and supplies.

Bringing shipboard allowances into balance by better analysis of supply usage information.

Simplifying and speeding up the issue of supplies in the Fleet and ashore.

Streamlining material movement techniques.

Improving the flow of communications between the Operating

Forces and supply support activities to assure maximum logistical responsiveness.

Finding more accurate ways to compute and apply readiness and cost factors in calculating stock levels, procurement schedules, the distribution of stocks, and the disposal of unneeded supplies.

Improving the measurement and control techniques used in the supply organization to assure good business management.

Continuing to foster interservice supply cooperation.

## *XI. Shore Establishment*

A strong shore establishment is essential to support the new Navy; the need to sustain and maintain increasingly complex ships, weapons, and aircraft demands more and better base facilities and continued development of new techniques, not only in engineering, but in administration and management. All this entails construction and operation of bases, and the forces to do this.

### **Construction Progress**

Total 1957 fiscal year obligations, mainly by contract awards, for the Navy's worldwide construction program were approximately \$428,000,000. Practically all design and construction are performed by contract with private firms. Approximately 5,000 contracts were financed from the military construction appropriations, from the annual appropriations of the Navy's management bureaus, from funds of the other military departments, or from other Government departments. The Air Force portion of the Spanish Bases Program is a major example of the work accomplished by the Navy for other agencies, which includes the U. S. Army and Veterans Administration.

Labor relations affecting Navy contracts have presented no serious problems during the 1957 fiscal year. Strikes and labor disputes occurred on some contracts but only to a minor degree, with none exerting a serious effect on procurement. There has been further improvement in enforcement of contractor compliance with Federal labor standards statutes. The degree of cooperation with the Department of Labor has reached a high not previously experienced in many years.

The Spanish Bases Program is progressing satisfactorily. During the year it accelerated considerably and thus made up for delays of the previous winter occasioned by the unusually heavy and prolonged rains and the severity of the winter season. Maximum use of Spanish labor and contractors has continued with good results.

Considerable effort was continued during the year on the development of the master jet aircraft complexes begun in prior years. This work consists of the development of facilities designed to promote maximum operational efficiency of such installations. A new fleet support station was started at New Iberia, Louisiana. New stations authorized were a modern jet seaplane facility at Hertford, North Carolina; an advance training base at Meridian, Mississippi, and a master jet air station at Lemoore, California.

The status of the Naval Station, Roosevelt Roads, Puerto Rico, was changed from partial maintenance to active with its designation as a guided missile training center for the Atlantic Fleet.

Texas Tower 3 (Nantucket) was accepted from the Navy by the Air Force on November 29, 1956. It is anticipated that the construction work on Texas Tower 4 (New York) will have been completed by the end of 1957. Fabrication work is underway for construction of two off-shore platforms in the Gulf of Mexico, off Panama City, Florida, which will house equipment for laboratory observations of the surrounding marine environment and other purposes.

In addition to work on the Spanish bases and Texas Towers, the Navy has made progress in construction of the joint long-range missile proving ground. The 12 major stations involved lie generally along a line from Cape Canaveral, Florida, to Ascension Island, approximately 5,000 miles distant. The Air Force is furnishing the bulk of funds for this work, although use will be shared with the Navy. Thirteen new lump-sum contracts, totaling approximately \$6,090,000, were awarded during the year and change orders for approximately \$510,000 were written. The work for construction at Fernando de Noronha, Brazil, was initiated during June. The work is approximately 66 percent complete.

By agreement with the Army, and pursuant to direction of the Secretary of Defense, the Navy is also the agent for all military construction in Guam and the Philippines, where programs of considerable magnitude are in progress.

Preliminary design of Air Force projects at Clark Air Force Base, Luzon, has been authorized for projects estimated to cost \$3,058,000. The Air Force program ultimately contemplates more than \$10,000,000 additional work for Clark Air Force Base, \$2,328,000 each for three stations at classified locations, and \$14,851,000 for Andersen Air Force Base on Guam.

The design for the ultra-low-frequency transmitter in Washington County, Maine, is nearing completion. It will be the most powerful transmitter in the Naval Establishment and will support the operation of submarine and surface forces and perform special communication functions in the North Atlantic and Arctic areas.

Among other major projects, facilities comprising the Polaris Program, totaling \$22,225,000, have been placed under contract or committed. Construction of the nuclear reactor at the Naval Research Laboratory, Anacostia, was completed. Facilities authorized in the amount of \$14,302,000 are being constructed at the David Taylor Model Basin. The computer building has been completed and placed in operation, and the variable-pressure water tunnel and the rotating arm and maneuvering basin building are scheduled for completion in February and November 1958, respectively.

The 4,000-ton concrete floating dry dock AFDL-48, the Navy's largest concrete dock, was accepted and towed from Seattle to San Diego and placed in operation at the Naval Repair Facility, Naval

Base, San Diego. Contracts were entered into for design of three carrier dry-docks capable of accommodating *Forrestal*-class and nuclear carriers, covering reconstruction of dry docks at the Boston, Puget Sound, and San Francisco Naval Shipyards. Throughout fiscal year 1957, the Bureau of Yards and Docks continued support of Operation DEEP FREEZE, the Navy's program in support of the United States' Antarctic contribution to the International Geophysical Year.

Mobile Construction Battalion (Special), Detachment One, engaged in completing construction of the 125-man base at McMurdo Sound and the 97-man base at Little America V, and made preparation for the establishment of the 17-man station at the South Pole and the 26-man station at Marie Byrd Land. Plans for DEEP FREEZE II call for resupply of the 4 stations and the construction of 3 additional stations to complete the United States program of 7 stations. These additional stations were a 39-man Weddell Sea station, a 27-man Knox Coast station, and a 14-man station in the vicinity of Cape Adare.

### Utilities

The cost of utility services purchased commercially during fiscal year 1957 totaled approximately \$43,000,000 as compared to \$42,580,000 in fiscal year 1956. In the face of mounting pressure for increases, the costs of these services have been held down through diligent and effective contract administration in this field of procurement.

Savings through rate adjustments, power factor improvement, transformation discounts, combining delivery points, utility conservation, etc., amounted to approximately \$4,000,000 in the fiscal year, approximately \$200,000 more than in the preceding year. These savings are recurring and cumulative. Thus the utility service needs of a greatly expanded shore establishment have been provided with very little increase in overall expenditure from year to year. Of the total expenditure for utility services used by the Navy, nearly \$23,000,000 was for electric services. The remaining \$20,000,000 covers gas, telephone service, water, sewerage, trash and garbage disposal, and similar services.

### Maintenance and Material

The Navy took several steps during the year toward more systematic management of the maintenance and operating functions of the Shore Establishment which resulted in substantial savings in plant maintenance and automotive transportation as well as in utility services.

There have been significant changes in the field of procurement and management of materials. The cost of maintaining mobilization reserve stocks has been balanced against the factors of continuing obsolescence and of possible use of such stocks under conditions of modern war. The result has been a policy of purifying these stocks and of reducing their level. At the same time, increased attention is being given to stock rotation in support of peacetime operations in order to keep stocks on hand up-to-date and serviceable.

### Housing

A total of 22,904 family public quarters at Navy and Marine Corps activities was reported for fiscal year 1957, compared with 21,637 in fiscal year 1956. This figure is expected to more than double during the next few years under Capehart and other housing programs. While the funds made available for routine maintenance and operation compared favorably with the previous year, amounts available for essential major repairs and equipment replacement were deeply cut because of budget limitations, impairing the maintenance of public quarters at adequate standards.

Acting under Congressional mandate, the Public Housing Administration has liquidated a considerable portion of its rental housing assets, both Lanham Act and Title III facilities—the latter predominately trailers. The Navy, however, requested transfer of certain projects to Navy jurisdiction and those approved for acquisition were transferred to Navy jurisdiction in accordance with law effective September 1, 1956. Under this legislation, the Department of the Navy acquired 198 Lanham Act units and 4,598 Title III units.

During the 1957 fiscal year the last units of the approved Wherry Housing Program were virtually completed. Remaining projects on which construction had not started were cancelled. At the end of the fiscal year there were 63 Wherry projects, totaling 24,239 units, completed and available, and 1 project, totaling 264 units, under construction.

Provisions of the Housing Act of 1956 (Public Law 1020, 84th Congress) regarding the taxing of leaseholds as real estate and the acquisition of Wherry projects developed problems which had not been satisfactorily settled at the end of the fiscal year. The Navy is taking an active part in the Department of Defense Ad Hoc Committee attempting to resolve these difficulties.

Pursuant to the provisions of Public Law 161, 84th Congress, a project was approved for 334 units of family housing at the Naval Air Station, Rota, Spain, under the Surplus Commodity Military Housing Program, and the contract soon will be awarded. A project for 620 similar units at Naval Activities, Port Lyautey, Morocco, is being

processed. Several other oversea projects under this program are planned for the next fiscal year.

The Department of the Navy has a tentative reservation of 35,000 family units of Capehart Housing from the 140,000-unit program prior to the expiration of the current legislation in 1958. All these quarters are being limited to military personnel, and each project is restricted by law to an average maximum development cost of \$16,500 per unit. The construction cost is amortized by means of a mortgage running for a term not to exceed 25 years and is retired by payments from the Military Pay and Allowance Appropriation.

As of June 30, 1957, 33,286 Navy Capehart Program units had been requested by the management bureaus and of that number 32,480 were recommended by the Chief of Naval Operations, 29,786 were sponsored by the Secretary of the Navy, 27,712 had the concurrence of the Federal Housing Administration, 21,462 were approved by the Department of Defense, and there were 595 construction starts.

### Seabees

The Bureau of Yards and Docks provides technical control and material support for the Naval Construction Forces (Seabees). At the beginning of the fiscal year these forces consisted of 10 Mobile Construction Battalions, 2 Amphibious Construction Battalions, the 30th Naval Construction Regiment; Commander, Construction Battalions, U. S. Atlantic Fleet; Commander, Tenth Naval Construction Brigade; and 2 Construction Battalion Base Units. During the year Mobile Construction Battalion 2 and the 30th Naval Construction Regiment were disestablished; Amphibious Construction Battalion 2 was reduced to approximately two-thirds the size of a full-strength Amphibious Construction Battalion; and the 4 Mobile Construction Battalions in the Atlantic Ocean area were reduced about 20 percent in strength.

The Naval Construction Forces operated with an average of approximately 230 officers and 7,450 enlisted men during the year, exclusive of the special Mobile Construction Battalion for Operation DEEP FREEZE.

## ***XII. Naval Research and Development***

In this era of growing technological demands and innovation, the Navy's research and development role has been greatly enhanced. The worldwide scientific effort of the International Geophysical Year closely parallels much of the Navy's regular research program, so the efforts of the Office of Naval Research (which this year was 10 years old), augmented by scientists of universities and research institutions, have been alined to take advantage of benefits inherent in such a comprehensive venture.

As in previous years, the Navy's research program is aimed at providing a fund of scientific knowledge to permit future naval weapons developments to serve a changing Navy. In addition to the major applied research programs, the Office of Naval Research searches constantly for new ideas or principles which lead to the development of new weapons or techniques. Projects on such new ideas generally are carried to the point where the technical feasibility of the principle has been established and then it is turned over to a Navy bureau for development and production. Thus, while fundamental research is centralized in the Office of Naval Research, development, as will be realized from other parts of this report, is a Navy-wide process in which all hands share.

The increase in research costs, combined with reduction in research funds, necessitated curtailment of some segments of the Navy's research during the past year, particularly in programs requiring large initial expenditures for equipment. There are, nevertheless, many areas of technical progress which may be reported briefly in this chapter as space and security permit.

### **Nuclear and Molecular Physics**

Research in basic physics continues to increase throughout the world, with ever greater impact upon the techniques and concepts of modern warfare. Large-scale research support of the physical sciences now offers, more than ever, new opportunities in support of the Nation's defense.

The Navy's nuclear physics program comprises a broad, though not complete, basic research effort concentrated in three major areas: Cosmic radiation, nuclear structure, and elementary particles.

The cosmic ray investigations deal with charged-particle radiation entering the earth's atmosphere from outer space and attempts to probe the exact nature and origin of cosmic radiation.

To support the nuclear physics program, the Naval Research Laboratory now operates a new 24,000,000-volt betatron research reactor, which became critical in fiscal year 1957, and several other accelerators. The reactor makes possible still further programs in chemistry, metallurgy, solid state physics, nuclear physics, and nuclear engineering.

The molecular physics program deals with the molecule as a stable unit in interactions with other molecules. This program studies the international relations of molecules, while nuclear physics is concerned with their domestic affairs.

These studies, for example, bear directly on the heating of the nose of a guided missile as it reenters the upper atmosphere.

### **Earth Sciences**

The earth sciences program of the Office of Naval Research gives the Navy increased understanding of the properties and processes of the environment in which it operates. It includes research in geophysics, geography, astronomy and astrophysics, oceanography, and meteorology.

#### *Geophysics*

The Navy's geophysics program attempts to measure the physical properties of the solid earth.

The use of long-range missiles requires more precise knowledge of the size and shape of the earth and of local variations between the direction of gravity and the true vertical. This knowledge is being obtained through a worldwide program of precise determinations using astronomy techniques and a program of marine gravity investigations.

Applied research in soil mechanics has led to improved designs for waterfront structures, particularly docks. Another project is to study the effect of various marine soils on mines.

The geophysics program also includes investigations in terrestrial magnetism, seismology, and geochemistry.

#### *Meteorology*

Navy meteorology research seeks a better understanding of the factors which make weather. This is particularly important for the meteorologist afloat, since he lacks much of the observational data and establishment available on shore.

As a partial remedy for this, the Navy is studying the use of automatic weather stations in free-floating buoys to make meteorological measurements and to telemeter these measurements to shore or ship-board receivers. The stations are designed for parachute-drops and can be located by radio fixes.

The role of electricity in the atmosphere is being examined. Are certain electrical effects a prelude to, and possibly a cause of, precipitation? There is some evidence to this effect, and further investigations are planned.

New missiles have created a demand for upper atmosphere information, and the missile itself serves this purpose. The rocket is being adapted for high-altitude weather reconnaissance. A camera in a rocket can record cloud cover and types up to 600 miles away. This system would, of course, be useful for ground reconnaissance in the absence of clouds.

### *Geography*

The geography research for the Navy has two functions. One is to study areas important to present or contemplated naval operations. The other is to learn how best to gather and analyze geographic information so that when previously unimportant or inaccessible areas are studied the work can be done quickly.

The importance of Arctic environments continues to demand high priority in field and laboratory investigations. Urgent naval requirements have led to a comprehensive study of the Arctic Ocean and problems associated with sea ice—its distribution, movement, formation, and disintegration.

Research in coastal geography enables us to characterize various kinds of coasts and determine rates, amounts, and mechanisms of change in beach and nearshore conditions. Indirect means for determining coastal conditions are also being developed. Since photo interpretation is one of the most fruitful means of indirectly obtaining geographic data, improvement in this field receives particular attention.

### *Astronomy and Astrophysics*

Research in astronomy and astrophysics seeks increased understanding of extra-terrestrial phenomena. The advanced knowledge, techniques, and equipment resulting from this research have immediate application to military technology in such areas as communications, navigation, high-altitude flight, and weather forecasting. Both optical and radio astronomy techniques are used.

Major emphasis falls at present on radio astronomy. This will provide much information on the propagation of electro-magnetic radiation through space, and it will contribute to the development of electronic equipment valuable in other fields.

The optical program includes research in such areas as position astronomy, astro-ballistics, celestial mechanics in the solar system, astrogas dynamics, spectroscopy, photometry, and solar astrophysics.

Solar studies are being emphasized because of their immediate interest. The effects of solar activity on communications have long been recognized, and now there is increasing agreement that it also affects our weather.

A radically different method of observation will, if successful, have far-reaching consequences. The quality of astronomical observations is limited by atmospheric turbulence. To minimize this a Navy balloon will lift observing equipment above much of the atmosphere. Equipment for obtaining a high-resolution photograph of the sun is now under construction and, if this is successful, other types of observations will be made. As a rather direct outcome of this experiment a much better evaluation of balloon-borne missile detecting and tracking systems is expected. This technique will also benefit the molecular physics program—carrying instruments aloft to observe solar and upper atmospheric phenomena.

Work on a spectroscopic classification of extremely distant star systems has resulted in a possible breakthrough in our knowledge of these systems. The results of the investigations may well influence the theory of origin of the universe.

### **Mathematics**

The mathematical sciences program continues to advance mathematical techniques to meet the increasing requirements of naval technology and the information-processing needs for tighter control of complex interrelated activities.

The applied mathematics program focuses on the creation of more mathematicians, of whom there is still a critical shortage; the development of techniques for solving engineering problems; and continued contact with abstract mathematics.

A vigorous basic program in mathematical statistics and probability has been maintained. Still the only research program of national scope in this field, it is designed to furnish the increasingly advanced statistical theories and techniques needed for the design and evaluation of weapons and control equipment. Work has likewise continued in a joint service program for mathematical and statistical research on selected problems of immediate concern in the research, production, and operations program of the armed forces.

In addition, there is an information systems program, on the development and use of modern high-speed computer equipment, which makes mathematical approaches of greatly increased sophistication both practical and economical. For example, the Navy has been at work for some time to develop a fully automatic integrated fleet tactical data system which would automatically process air and sea traffic over a large area, sorting the traffic into various categories and threats. Appropriate weapons would automatically be assigned

to hostile targets whose threat exceeds a certain threshold. A working model of such a system is presently in existence and in progress toward actual operation under simulated combat conditions.

### **Chemistry**

The Navy's chemistry research program strives to provide the basic knowledge which will result in improved materials and chemical equipment required for better operational capabilities of ships, aircraft, and missiles. Improvements are desired in fuels, lubricants, coatings for prevention of corrosion and deterioration, plastics and elastomers for structural and other applications, etc. In addition, such problems as submarine atmosphere control depend upon chemistry for their solution.

As an example of Navy chemical research, an active program on the properties of nitrogen oxides is in progress. These oxides are important in solid propellant combustion as well as in various types of rockets. Future emphasis in the liquid propellant field will be on new oxidizers. This is an area which has seen the least advance in the past decade and which offers the greatest challenge.

### **Psychological Sciences**

Human capacities are increasingly likely to be limiting factors in the complex weapons and systems available from now on. There are new and changing requirements for better understanding of man-machine systems within a total weapons system, for more precise knowledge of human capacities and limitations, and for knowledge of human behavior in terms that can be used in the design of new equipment.

For example, the Naval Research Laboratory is working toward a shipboard combat information system capable of handling large numbers of targets without confusing either men or machines. Advanced developments are being fully exploited, and evaluation of the entire system will soon begin.

One problem receiving increased attention is that of keeping man oriented and functioning efficiently when minimum sensory data are received, such as in enclosed aircraft cockpits, rocket control areas, and satellite vehicles. We know much about high-intensity noise and its effect upon human performance, but need to know much more. It is now evident, moreover, that research must cover the entire sound spectrum, from subsonic through ultrasonic frequencies.

### **Operations Research**

#### *For the Chief of Naval Operations*

The Office of Naval Research continued to provide for the operations research needs of the Chief of Naval Operations through con-

tract with the Massachusetts Institute of Technology. The bulk of this work relates to decisions affecting naval operations of the present and near future and to determination of operational requirements for research and development. In addition, about one-tenth of the effort is devoted to long-range analysis of strategic problems.

Seven major studies for wide dissemination and more than 60 additional papers on more restricted subjects were prepared in connection with near-term matters. The major studies dealt with recommended carrier task force formations against nuclear weapons delivery by aircraft and submarines, tactical problems and optimum design of the continental Distant Early Warning lines, operational implications of "clean" nuclear weapons, factors affecting the ability of combat air patrol to detect enemy aircraft, radiation hazards of atomic depth charges, and maintenance of carrier aircraft. The more restricted papers cover in the aggregate nearly the entire spectrum of naval operations.

In addition, 3 major studies and 10 memoranda were prepared in connection with long-range planning. The studies concerned the prediction of naval budgets in the future, the infeasibility of a global airlift to meet either peacetime or wartime United States shipping needs, and the radiological warfare potentialities of the fleet ballistic missile. Important memoranda dealt with national policy implications of atomic parity, the balance of peacetime procurement and research and development spending, and the balance of ASW forces for the protection of overseas transport.

In addition to the publication of studies, services were provided at the request of 15 major units of the Fleet by the assignment of individuals to operating staffs.

#### *For the Chief of Naval Research*

Effective coordination of research programs involves more than avoiding duplications and plugging gaps. The great problem is to make the best distribution of effort among various warfare systems, all of which are important but which must compete among themselves for the limited amount of available talent and funds.

Such decisions stem from technical and operational studies of the Navy's operational missions and tasks. The resulting technical requirements are then related to the research and development program, and recommendations are offered for a balanced R&D program best tailored to operational needs.

Two major studies, 1 on fleet ballistic missiles (FBM) and 1 on training for fleet air defense, were completed this year, and 4 major studies were initiated.

The top priority fleet ballistic missiles system study (and supplement) determined the best types of ships for launching JUPITER

and for launching POLARIS. The study also indicated targets most suitable for FBM bombardment.

The study on fleet air defense training surveyed training requirements for advanced weapons systems in the air defense of the Fleet. It was conducted on an urgent basis by a special study group and included an estimate of the additional manpower and training demands resulting from advanced weapons.

The antisubmarine warfare training study, one of the most important studies still in progress, is similar to the air defense training study in objective and approach.

Another study is comparing the REGULUS II and TRITON missiles, while, in Project FLAME, fleet defense against all types of missiles is being explored.

## **New Developments**

### *Air Warfare and Air Defense*

New developments in aircraft fire control systems to improve present and future aircraft delivery capabilities, both in air-to-air and air-to-surface weapons, are being pursued:

(1) A passive infrared system to be used as auxiliary equipment for day fighter aircraft use at night for target acquisition.

(2) A terrain clearance radar to give a true all-weather capability for air special weapons delivery.

Emergency funds have been allocated to the Office of Naval Research and the Bureau of Aeronautics to proceed with development of a new concept in cockpit instrumentation of aircraft. If successful, this concept may be the breakthrough for simplified all-weather, all-condition operation of piloted aircraft. Ultimately, this concept could furnish automatically the following information to the pilot:

- (1) Navigation.
- (2) Flight instrumentation.
- (3) Target detection, acquisition, and tracking ranging.
- (4) Identification.
- (5) Power plant conditions and operation.
- (6) Fire control.
- (7) Visual presentation for all-weather flying.

Two new higher and faster all-weather interceptors were started during this fiscal year as a follow-on for carrier-based fighters now in fleet use. The new models may utilize rocket-augmented thrust. Bids for a new close-support all-weather aircraft capable of longer range and endurance at both high and low altitudes and with the ability to carry a wide variety of air delivered weapons have been requested.

Air defense research and development continues to receive high priority, particularly airborne surveillance, radar detection, identi-

fication and control, airborne tactical data-handling and display, improved carrier-based and noncarrier-based airborne early warning systems, and shipboard tactical data systems with compatible communications data link.

Improvements in propellants in the guided missile field show promise of increasing air defense capability by obtaining higher altitudes and increased ranges and speeds. Great emphasis is being placed on improving missile capability of combating low-altitude attacks.

An initial design contract for a conventional altitude jet VTOL (vertical takeoff and landing) has been awarded. A sharp look is being made into an operational requirement for an airborne air defense weapons system composed of a subsonic fighter armed with long-range missiles. This concept has been under study by the Navy, industry, and contractual groups for some time and possibly will be called out early in fiscal year 1958.

Steady progress has continued in the Airborne Early Warning (AEW) field during fiscal year 1957. Significant achievements have been made in UHF airborne radar, airborne moving-target indication, simultaneous air search, and height-finding and airborne tactical data systems.

Development of an airborne data-handling system is also well advanced and initial evaluation is programed to begin in September 1958.

Action to insure compatibility between a shipboard data-handling system and an airborne one is in the final stage of consummation.

The interim carrier-based AEW system (WF-2 aircraft) is progressing rapidly. The aerodynamic prototype made its first flight in December 1956 and successfully completed Navy preliminary evaluation in May 1957. The lightweight AN/AP-82 radar progressed beyond the prototype phase in May 1957. The WF-2 aircraft is scheduled to begin fleet service in September 1959.

#### *Antisubmarine Warfare*

Research and development in antisubmarine warfare during the past year has emphasized (1) longer detection ranges on submerged submarines; (2) classification of submerged targets; (3) improved antisubmarine weapons for surface ships, submarines, and aircraft; and (4) improved communication for antisubmarine warfare. Timely solution of the foregoing problems will require increasing efforts and funding.

Work is progressing on the ASW seaplane with mockup of the Convair proposal about to commence. The fiscal year 1958 budget provides funds for early processing of operational requirements and development characteristics for a new ASW landplane. Prototypes

of current ASW equipment in aircraft are currently undergoing evaluation. Preliminary reports indicate feasibility of new equipment developments to be available for all new ASW aircraft.

Contracts have been let for the development of two new airborne sonars which will materially increase the search-rate, range, and speed of advance of helicopters. The HSS-2 follow-on for the HSS-1, specifications for which have been drawn, will be a twin-turbine, all-weather helicopter with greater endurance, so designed as to accommodate the new sonar equipment mentioned above.

#### *Mine Warfare*

Review of progress in the mine warfare research and development program continues. Increased emphasis, including higher priorities, has been given to the mine-countermeasures program in order to solve formidable technological problems.

The helicopter mine-countermeasures system development was continued during the year. New light-weight moored-sweep gear and prototype acoustic and magnetic sweeps are to be evaluated during fiscal year 1958. Emphasis has been placed on the mine hunting and destruction problems. Assignment of a limited number of mine-countermeasures helicopters to the Fleet for development of tactics and procedures has been recommended. Studies of costs and suitable vehicles for this purpose are now underway.

#### *Amphibious Warfare*

New landing craft with greater power and planing hull design are being developed to increase speed of ship-to-shore movement of troops and supplies. Increased speed of these landing craft will help to make possible greater dispersal of amphibious task forces, thereby rendering the conventional, surface amphibious attack less vulnerable to nuclear weapons. A new landing craft control system to guide boat waves ashore during periods of low visibility is presently under operational evaluation. The same type system may be extended ashore for use by landing forces and for guidance of helicopters and close-support aircraft.

#### *Electronic Warfare (ECM/ECCM)*

Increased emphasis has been placed on development and procurement of modern electronic countermeasures receivers and transmitters in the light of increasing dependence on electronics in our current and anticipated weapon systems. Present and future programs are designed to provide equipment for detecting and jamming enemy electronic devices. Trends in development include automatic operation, extremely fast turning transmitting tubes, and small lightweight components.

Issuance of revised requirements will define the ECM problem much more realistically with respect to demands of a rapidly expanding electronic technology. Development is also stressing the need for careful design to match the human operator to his equipment. This has been found to be an extremely important consideration in obtaining successful results with ECM equipment.

### *Conclusion*

Since World War II, the Office of Naval Research has pioneered the United States effort in research and continues to enjoy a remarkable reputation.

Additional scientific research is now even more essential.

Setbacks and temporary failures can be expected in the future as they have been experienced in the past. This is a part of the very nature of scientific development. Yet, based on their capabilities and past sound performance, the Navy has confidence in the future performance of its scientific teams. It is only necessary to provide all needed resources, encourage them, and apply their results as quickly as possible.

### **XIII. Business Management**

#### **Procurement**

The Navy's total net procurement in fiscal year 1957 was \$5.7 billion as compared to \$5.2 billion during fiscal year 1956. During the first 11 months of the fiscal year, new procurement amounted to \$6.3 billion, an increase of \$1.5 billion over the same period in fiscal 1956.

Aeronautical needs continue greatest in the procurement field.

Through May 1957, 1,014,030 net procurement actions were executed. Eighteen percent of all awards were made as a result of formal advertising.

The Navy accepted \$2.835 billion worth of material during the year, which is a slight increase over the \$2.832 billion accepted in fiscal year 1956. This marks the end of the decline in workload experience since the end of war in Korea and indicates a leveling off during the past 2 years.

#### **Aid to Small Business**

Small business continued to receive most prime contracts suitable for production by such firms. Increased use of the "set-aside" procedure assisted small business in gaining better competitive opportunity. We are continuing to emphasize and encourage placement of subcontracts with small business firms.

From July 1 to December 31, 1956, through the Navy portion of the Defense Subcontracting Small Business Program, small business firms received first-tier subcontract awards from prime contractors valued at \$715,169,000 which represented one-fifth of the total military business received by these prime contractors from all Services during the period, an increase of 3.4 percent over the previous year. It is estimated that for the first 11 months of fiscal 1957, small business firms received \$1,723,082,000, or 35.6 percent of Navy procurement dollars, through prime and subcontract awards. Most of these subcontract awards to small business were placed by the aircraft and the electronic industries.

Including May 1957, the Navy spent \$4,840,055,000 within the United States for ships, aircraft, and ordnance; electronic and communication equipment; transportation; construction; and material, supplies, and services required to support the operation of the United States Fleet. Approximately 30.2 percent of these Navy procurement dollars are estimated to have reached small business.

Through small business "set-asides," formal advertisement, and contract negotiation, small business firms received Navy prime con-

tracts valued at \$943,839,000 or 19.5 percent of the Navy procurement dollars spent for the period. Small business received \$158,229,000 more in Navy prime contracts during fiscal year 1957 than in fiscal year 1956.

During the first 11 months of fiscal 1957, 3,857 "set-asides" with a total dollar value of \$215,840,085 were initiated by Small Business Administration representatives and agreed to by Navy contracting officers. This is an increase of 1,397 "set-asides" and \$36,869,093 in value. More than 22.8 percent of the Navy contract awards to small business were effected through "set-asides."

### **Contracting**

Dollar savings by direct action of the Office of Naval Material were effected through contract clearance and the placement of insurance by competitive bidding.

More than 2,000 contract pricing actions involving individual sums greater than \$300,000 were cleared through the Office of Naval Material during fiscal year 1957, and \$10.1 million was realized in direct savings. With the greater portion of the Navy's contract dollar being spent in aircraft and aircraft equipment, improved techniques in pricing in that category are particularly important. Intensive efforts were made to improve the contracting methods for major aircraft engine procurement, since these involve multimillion dollar sums.

The contract termination backlog was reduced. Claims were settled at an average monthly rate of \$72.2 million, while new terminations were effected at an average monthly rate of \$38.3 million.

### **Industry Preparedness**

Industry preparedness measures were emphasized during the year. These measures are the means to shorten conversion reactivation and production times, as well as to reduce plant vulnerability and requirements for industrial manpower, critical materials, and costs.

The "DOD Register of Planned Mobilization Producers" lists approximately 21,000 industrial plants with which production allocation planning is being conducted. In approximately 6,000 of these plants, the Navy has responsibility for all armed services procurement.

Increasing efforts were directed during the year to reduce the number of industrial plants directly under Navy sponsorship and align the Navy Industrial Reserve Plant Program with latest mobilization planning. The total number of plants was reduced from 177 to 160. Thirteen plants were sold to private concerns after World War II, subject to the restrictions of a national security clause which expired in 1957. One plant was consolidated with an adjacent Government-owned plant, and 3 were disposed of to the General Services Administration. Eight are in preliminary stages of disposal.

## Material Disposal

In the Material Disposal Program during fiscal year 1957, the Navy Department disposed of excess property which originally cost the Government approximately \$1.5 billion, approximately \$2 million over the amount disposed of during the preceding fiscal year. In addition, the screening program resulted in redistribution within the Navy of excess property, originally costing approximately \$41 million, and the transfer of property, originally costing approximately \$85 million, to the Army, the Air Force, other Government agencies, and foreign aid. Property originally costing approximately \$52 million was donated for educational and health purposes.

## Real Estate

During fiscal year 1957, the Navy's real estate operations functioned under a reorganized structure in the Bureau of Yards and Docks designed to promote efficiency and to speed up handling of real estate matters.

As of July 1, 1957, the real estate acquisition workload (in respect to MCON and MCNRF programs) consists of 83 projects totaling 1,133,684 acres, at an estimated budgeted cost of \$46,023,667.

The flight clearance and obstruction removal program authorized by Public Law 161, 84th Congress, contemplates the acquisition of land and/or clearance easements at 53 naval air stations. This program includes removal of flight obstructions and relocation of roads and public utilities where necessary. Its primary purpose is to provide safety of flight at air stations while avoiding the staggering costs of abandonment and relocation of existing facilities. This \$23-million program has been slow in progress because of its magnitude, but most of the difficulties encountered have now been resolved.

Real estate projects included in the proposed 1958 military construction programs are based upon realistic advance planning, firmly established land requirements, and careful appraisals. It is believed that the budget estimates are adequate to permit the rapid completion of the land acquisition projects after the programs are authorized and funded.

Lessees of Naval Industrial Reserve Plants during the past fiscal year paid more than \$2 million into the Treasury as cash rent and performed maintenance in lieu of cash rent having an estimated value of \$2,368,000. In addition, the lessees paid approximately \$337,935,000 insurance coverage and provided plant security in excess of \$167,000.

During the fiscal year, the Department of the Navy declared excess to the General Services Administration 9,787 acres of land having an acquisition and cost of construction value of \$24,503,852. The

Navy also transferred to the Army, Air Force, and other Government agencies, 1,804.49 acres of land and improvements having a value of approximately \$3,184,975. In addition, 1,317 acres of land with improvements were sold, and the Navy realized \$152,325 therefrom.

Income from sale of oil, gas, natural gasoline, royalties, and rentals from the Naval Petroleum Reserves aggregated \$15,143,444 during the fiscal year. Expenses of all operations were approximately \$1,990,000.

### Civilian Personnel

On June 30, 1957, the Department of the Navy had 389,717 civilian employees. The Department continues to remain the third largest employer of civilian personnel in the Federal Government. Total employment decreased 4,952 during the fiscal year.

Distribution of civilian employees at departmental and field activities at home and overseas is shown in the following table:

<i>Management Agency</i>	<i>30 June 1956</i>	<i>30 June 1957</i>
Chief of Naval Operations.....	8,428	8,400
Marine Corps.....	17,351	17,201
Bureau of Aeronautics.....	83,694	88,645
Bureau of Medicine and Surgery.....	8,466	8,199
Bureau of Naval Personnel.....	9,210	9,184
Bureau of Ordnance.....	48,856	44,223
Bureau of Ships.....	125,416	122,589
Bureau of Supplies and Accounts.....	44,812	43,309
Bureau of Yards and Docks.....	21,908	22,018
Military Sea Transportation Service.....	12,744	12,000
Others.....	13,784	13,949
Total.....	394,669	389,717

An adequate labor market exists in most occupational categories. An acute shortage still exists, however, in the supply of engineers and physical scientists. The minimum pay rates for engineers and scientists have been increased through grades GS-11, through grades GS-17 for certain of the aeronautical research engineers, through GS-12 for patent advisors, and through GS-15 for medical officers.

During the fiscal year, the Office of Industrial Relations made a comprehensive study of the recruitment and retention of physical scientists, engineers, architects, and mathematicians in the intermediate and upper grades. This showed conclusively that higher salaries were needed. The Department has therefore recommended to the Civil Service Commission further advances in minimum salaries for GS-9 through GS-11 engineering and physical science occupational groups and increased minimum salaries for these groups at grades GS-12 through GS-15.

Naval activities have attempted to alleviate the impact of manpower shortages during the past year by the use of job dilution, overtime, special recruitment programs, training programs, job contracting, and summer programs. Such practices will continue.

During the year emphasis has been continued on improving the quality of employees selected for oversea assignments. An effort is being made to fill oversea vacancies that cannot be filled locally with persons employed in naval activities in the continental United States. About 85 percent of the oversea vacancies that could not be filled on the spot went to employees of naval activities in the United States.

Under the Department's Incentive Awards Program, savings were realized of \$98,265,807. Over 35 percent of all beneficial suggestions by employees were adopted, and \$2,525,520 in awards were paid out to accomplish the savings which resulted.

Progress was made in simplification of position descriptions, development of occupational information, and decentralization of classification authority. In addition a simplified procedure was developed for adding ratings to activity wage schedules.

## Safety

The Navy Traffic Safety Program for off-duty military personnel was established in fiscal year 1956. Tabulated below are comparative statistics covering this program for calendar years 1955, 1956, and the first quarter of 1957.

<i>Calendar Year</i>	<i>Fatalities</i>	<i>Injuries</i>	<i>Estimated costs (thousand dollars)</i>
1955 -----	601	6,792	\$34,250
1956 -----	641	7,155	35,554
1957* -----	116	1,619	6,533

\*First quarter.

In calendar year 1956 the Department of the Navy won its seventh National Safety Council Award of Honor.

## ***XIV. Budget and Finance***

During fiscal year 1957, the Navy expended \$10.4 billion. This amounts to about \$60 for every man, woman, and child in the United States. Stated in another way, Navy expenditures amounted to about 15 cents out of every dollar expended by the Federal Government. Clearly, the Navy has been entrusted by the Congress with enormous financial responsibilities.

### **Basis of the Budget**

The basic philosophy on which the fiscal year 1957 and fiscal year 1958 budgets were developed was that expressed by the President who once stated that “. . . while we must never put dollars above the security of the United States, it is essential for the welfare of the country that we maintain a sound economy.”

Of the two choices available—immediate mobilization or continued preparation for a long period of so-called cold war—the Navy budgets for 1957 and 1958 were based on the premise that the Nation must live within its means and that a long-range planning approach must be maintained which would provide relative stability in the defense effort. More specifically, the Navy budget was developed on the premise that a high state of immediate readiness must be maintained and that an acceptable degree of future modernization was also essential.

### **Funds Available**

After long and careful consideration, the Congress appropriated \$10.2 billion in new obligational authority to Navy for fiscal year 1957. This represented the granting of new authority to incur obligations for the future payment of salaries, purchase of equipment and supplies, and contractual services. Since the Navy entered the fiscal year with “carryover” or prior-year funds of \$12.4 billion, nearly all of which was already obligated or held in a reserve status for long lead-time procurement items, such as ships, aircraft, and guided missiles, it had available for expenditure from these sources during the year a total of \$22.6 billion (\$10.2 billion + \$12.4 billion). The Navy spent \$10.4 billion during the fiscal year, and \$11.8 billion was carried forward into fiscal year 1958 for expenditures in 1958 or later years as deliveries are made under procurement contracts and work orders. In accordance with law, about \$500 million of funds expired, lapsed, or was rescinded and reverted to the Treasury.

### Where the Money Went

The broad purposes or functions for which the Navy's funds are expended each year, together with expenditures in fiscal year 1957, are set forth in the following table:

<i>Budget category</i>	<i>Amount (in millions of dollars)</i>	<i>Percent</i>
Military Personnel.....	\$3,080	30
Operations and Maintenance.....	2,475	25
Major Procurement and Production.....	3,755	35
Military Public Works.....	370	4
Reserve Components.....	226	2
Research and Development.....	523	5
DOD Establishment-wide.....	25	--
Working Capital Funds.....	-103	-1
Undistributed.....	47	--
	10,398	100

As the table shows, more money went for major procurement than anything else. These expenditures, which constituted \$3.6 billion or about 35 percent of the total, were for new aircraft, ships, combat vehicles, weapons, guided missiles, ammunition, electronics, and other procurement items of a long lead-time nature. Almost \$2.0 billion were spent for new aircraft alone, or just under 20 percent of the entire Navy budget. Expenditures for shipbuilding totaled \$864 million.

Military personnel costs totaled approximately \$3.1 billion or approximately 30 percent of the total budget. These costs, which supported about 675,000 officers and men of the Navy and approximately 200,000 Marines, were primarily for pay, allowances, subsistence, individual clothing, and individual transportation.

The other large category of expenditure was for operations and maintenance, which accounted for approximately 25 percent of total expenditures, or \$2.5 billion. This important segment of the budget included funds for maintaining and operating the Fleet, aircraft, and Marine units as well as the Shore Establishment, such as air stations, shipyards, ordnance plants, supply depots, and hospitals. With the funds in this category, the Navy operated about 980 active fleet ships and just under 10,000 Navy and Marine Corps aircraft. It also supported 3 Marine divisions and 3 Marine air wings, as well as a shore establishment consisting of about 330 major activities and hundreds of minor ones.

Research and development expenditures exceeded \$500 million during the year, and absorbed about 5 percent of the Navy's funds. High-

est priority was given to the continued development of striking power, antisubmarine warfare, and fleet air defense.

Expenditures in other areas were also sizable, amounting to \$226 million, or just over 2 percent of the budget, for the various reserve components of the Navy and Marine Corps, and \$362 million—slightly under 4 percent of total expenditures—for public works including items such as research facilities, extensions to or new air fields and bases, defense housing, docks, and ordnance facilities.

## XV. Conclusion

As I report on the state of the Navy, I cannot overlook the enormous military changes which have occurred in the recent past. Nor, although this report nominally ends with June 1957, can I overlook some of the consequences of the launching of the Russian earth-satellite last October.

We know that today and tomorrow have left the past forever. It is an extraordinary period in our history, and it has come upon us very quickly.

The military changes which are forging the new Navy are comprehensive and final. Missiles are here. Guns are going. Atomic propulsion is in fleet service, and we are on the way to an atomic Navy. It is a very big, expensive, and difficult change to achieve, but it can be done, and it is essential.

A time of change is a time to get things done.

Always we walk a difficult line—a careful, calculated balance between maintaining immediate readiness for today's crises, and modernization to speed our transition into tomorrow.

To be alert and ready demands our primary attention, yet progress has come fast and been great, and we must lead. This is the balance, the compromise we make. It sways every decision, every day.

In this time of change we have made hard choices. We have divorced ourselves from the past. We have set aside some things that once were important—we have reduced or eliminated some types of ships and aircraft. We have cut back support activities. Choices of this kind will inevitably be necessary and will continue to face us. Again, we must balance between readiness for today and the new things we need and can get. We do this to put our chips on the things that count most—missiles, advanced aircraft, better radar, nuclear-powered ships, versatile Marines, ready combat forces.

We must continue to improve our quality, especially in advanced technology, in readiness, and in people.

We believe that our special functions and the capabilities of the Navy and Marine Corps are more than ever essential. As we appraise the threat that faces us and look ahead, it is inevitable that we must use the seas to strengthen our national deterrent power and reduce our vulnerability.

Even now, we can significantly increase the striking power of our maritime forces. In the short term, especially for limited wars, we can considerably improve the volume and impact of carrier aircraft strikes. In emergencies we can put more ships to sea, as we did

during the Suez crisis. This we can do in a hurry. Over the longer term we can concentrate on the nuclear-propelled missile submarines, the high-performance jet seaplanes, the all-helicopter assault, and other sea-based weapons systems. These measures would not only increase the total capability of the United States, but would impose serious defensive problems on any enemy—problems that would be different, burdensome, and perhaps insoluble. Certainly they would force an enemy to divert some of his fire and much of his resources away from our land and from our Allies.

Given the shield of mutual deterrence, power to prevent limited aggression and to win limited war becomes decisive. Clearly this power demands combat forces in being ready today, not 6 weeks from today.

We have great pride in our deployed forces—the cutting edge of sea power—the Sixth and Seventh Fleets, the Fleet Marine Forces. They contribute greatly to peace and even more to our potential in war. To keep them strong and capable requires advanced scientific and technical development, just as much as ballistic-missile warfare.

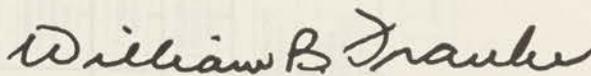
The free world is an oceanic coalition. The military, economic, and political links that join us extend across the seas.

Control of these seas is threatened as never before by the Soviet Navy, and particularly by their massive submarine forces. It is a matter of life and death to contain these submarines and to annul their threat—a threat not only to our sea life-lines. With their possible missile-firing capabilities, it is a threat to our own heartland.

This is a Navy responsibility. We have made some encouraging progress, but it would be very wrong to say that the problems posed by the Russian submarine threat have been solved. We are exploiting every avenue of approach, but we must do a great deal more, especially in research, advanced technology, and antisubmarine forces in being before we can be sure of success.

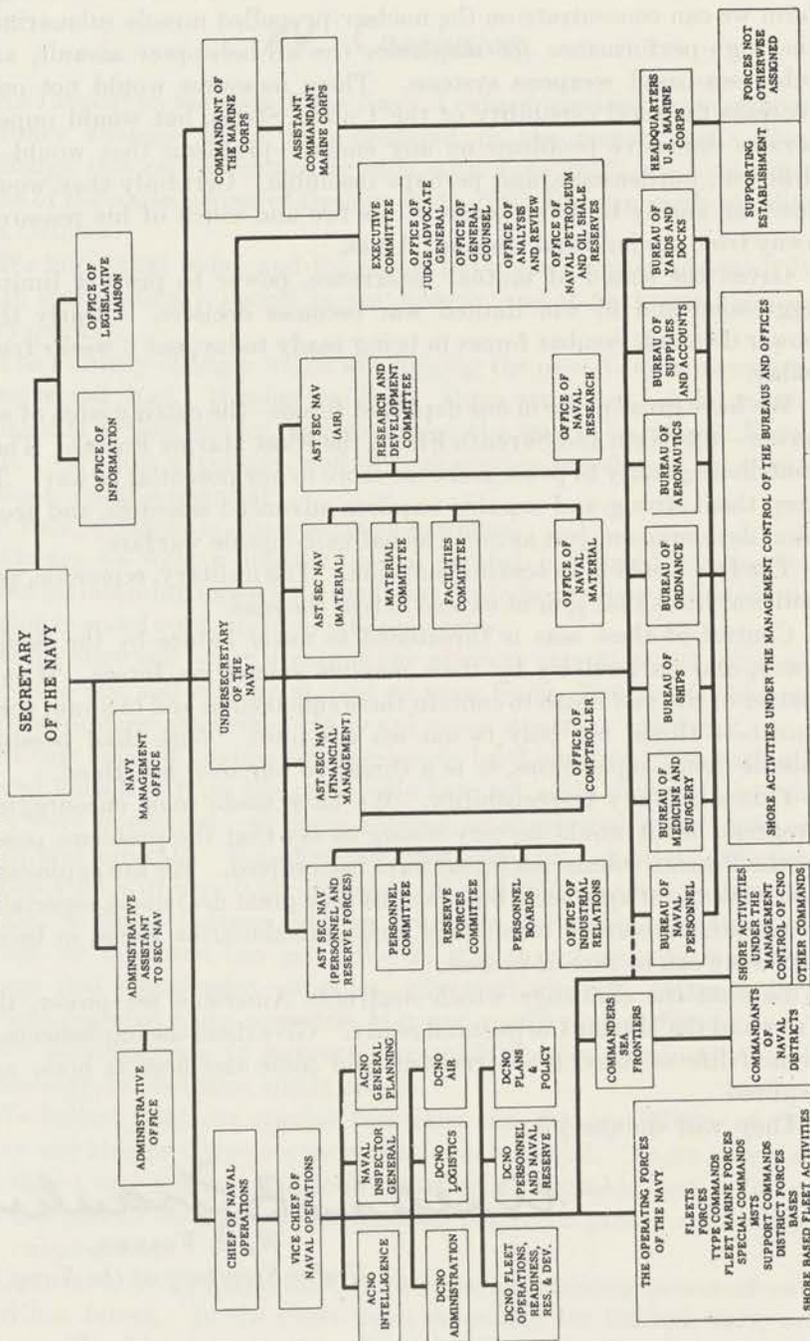
To meet the challenge which confronts American sea power, the Navy and the Marine Corps stand ready. Give them the implements—even if life as usual is interrupted, and some sacrifices at home are required.

They will do the job.



W. B. FRANKE,  
*Under Secretary of the Navy.*

# DEPARTMENT OF THE NAVY



## *I. Introduction*

The year 1957 was significant for the position of the Air Force in the Department of Defense. It was a year of transition, a year of change, and a year of growth. The Air Force was faced with the challenge of maintaining its position as the primary provider of air and space power to the United States and its allies. The Air Force was also faced with the challenge of maintaining its position as the primary provider of air and space power to the United States and its allies. The Air Force was also faced with the challenge of maintaining its position as the primary provider of air and space power to the United States and its allies.

# **Semiannual Report of the SECRETARY OF THE AIR FORCE**

**January 1, 1957, to June 30, 1957**

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## I. Introduction

The year 1957 was memorable for the constructive contributions made to American thinking about national security. Soviet Russia's achievements in the military sciences shocked many Americans into a realization that the United States does not possess an exclusive genius to lead the world in every form of skill and invention. The national awakening also brought with it some conceptions of Soviet technological progress that caused many people to infer, incorrectly, that our temporary technical inferiority in some fields was synonymous with strategic inferiority.

A position of strategic inferiority could come about if the Soviet Union should, for example, develop and produce enough guided missiles of such accuracy as to enable them to wipe out our retaliatory force, or if they should contrive an air defense so invulnerable as to nullify our retaliatory power. But to the very best of our knowledge, these situations did not exist in 1957. We can prevent them from ever taking place by increasing our own rate of progress. And during this period we can spare ourselves self-punishment by avoiding direct comparisons of *future* Soviet military potentials with *present* United States capabilities.

No matter how much we intensify our national effort, we can expect to be temporarily inferior to the Soviet Union in one or another aspect of our weapon technology. This is especially true since we must protect ourselves against a wide variety of dangers while the Soviet Union, which holds the strategic initiative, can concentrate on its most effective weapons.

The continuing problem of maintaining successful deterrent forces has been rendered acute because the nature of the forces themselves is changing. While we are maintaining proven weapon systems in being, we are at the same time building and testing the radically different weapons of the future. Many of our resources are being used in the search for new weapons and improved combat capabilities. For example, the growing importance of guided missiles in defense planning for 1957 may be reflected in the increasing percentages of Air Force dollars being spent for them. In 1954, about 10 percent of procurement money went for missiles and approximately 90 percent for aircraft. Money and effort spent on missiles have been increasing at an accelerating rate, a trend that we expect to continue in the years ahead. In the fiscal year beginning on July 1, 1957, for example, about 35 percent of procurement funds will be spent on missiles, and

within the next 3 years we estimate that procurement money will be divided equally between missiles and aircraft.

It would be premature, however, to sound the knell of the manned bomber any time in the near future. It is true that ballistic missiles with their unique ability to traverse great distances at ultrasonic speeds and their comparative immunity to the hazards of weather and enemy defensive measures are playing an increasingly important role in our retaliatory potential. Manned bombers, on the other hand, offer their own distinctive advantages, including the ability to attack from any direction as well as to respond to new or diversionary orders while in flight.

We shall continue indefinitely, therefore, to emphasize manned bombers along with guided missiles, recognizing that we must continue to concentrate on an even more advanced missile technology and a more widely dispersed bomber force than any aggressor would require. Our requirement is to build a force designed primarily to respond to attack, rather than to initiate one. The Soviet Union, on the other hand, can afford to relax its standards because it can choose the time to start a total war with the certain knowledge that our counter-blow would not begin until we learned unquestionably that their force was on the way. Consequently, while some dispersal of Russian installations is undoubtedly taking place, it is a less critical factor in Communist planning because their force will be enroute to targets before we launch a return blow.

If we accept the inherent logic of this self-imposed handicap, we cannot be content simply to stay even with the Soviet Union. We must bend every effort to shorten the responsive time of our retaliatory forces and the quality of this response. To this objective, we have: Progressively phased out of first-line forces the obsolescent B-36 in favor of 600 m. p. h. B-52's; halted production of the B-47 Stratojet; shifted emphasis to the B-58, the first supersonic bomber in the world; instituted an alert concept which keeps a portion of SAC's bomber fleet in the air and ready to go at all times; put the KC-135 jet tanker in production; and planned a wider base dispersal program—all to lend greater flexibility to the SAC combat capability.

Concurrent in our strategic planning is the joint United States-Canadian effort to defend North America from large-scale attacks. To maintain the strategic balance in our favor we must minimize the results which the Soviet Union might expect to obtain through such an attack. To this end, several important milestones in the air defense of this continent were passed in 1957. The vast SAGE (Semi-Automatic Ground Environment) system went into partial operation; the remarkable White Alice communication system was completed; and the \$500,000,000 DEW (Distant Early Warning) line was given final

tests preparatory to being placed in full-scale operation. All these "electronic Paul Reveres" will in the years ahead form key links in the chain which will detect and track any airborne enemy incursion. Perhaps even more significant for the future, technical studies completed during the year confirmed the reasonable expectation that before too long it will be possible to produce devices capable of destroying missiles in flight. Yet, only a short time ago the ballistic missile was hailed as "the ultimate weapon."

Substantial progress attained in other fields of endeavor also improved our air defense capability. In the MB-1 GENIE, the Air Force successfully packaged a nuclear charge sufficiently compact to be used for precision air-to-air defense without endangering inhabited areas below. At the same time the BOMARC IM-99 pilotless interceptor, to be used for long-range area defense, passed its final exacting tests. And to fuse all the diverse organizations and weapons into a coordinated military machine, the United States and Canada readied the North American Air Defense Command (NORAD) as an integrated air defense command under a single control.

1957 was also noteworthy for events which underscored the interdependence of nations in the free world and the role that tactical air power might play in helping them to preserve their collective stake in the peace. Despite the acknowledged power of the Strategic Air Command, our principal retaliatory force, there has remained a possibility that war could start because an enemy makes an error in judgment or takes some reckless or opportunistic action. Because of this chance we are now giving renewed emphasis to increasing the mobility and striking power of our tactical air forces. In conjunction with Army and Navy units, TAC aircraft and missiles support ground and sea forces in maintaining the integrity of forward areas around the world. For if our line is not defended throughout, an aggressor might trump up a pretext for crossing it. We would then face not only an accomplished fact, as we did in Korea, but also a dilemma: If we did not take immediate action we would fail to meet the commitments to our allies; if we did take it, a total war would ensue. On the other hand, if our forces are maintained in reasonable balanced strength, and if any potential aggressor knows this beyond doubt, then any inclination on his part to cross the line makes him face the decision of precipitating hostiles with an almost certain prospect of his own destruction. Consequently, 1957 may be considered as a landmark which brought to Americans fuller recognition that all the balanced forces (ground, sea, and air) of the Western Alliance have become an essential part of the deterrent.

In 1957, man stood on the threshold of space which holds limitless opportunities for expanding the frontiers of his knowledge. During

the year, Air Force scientists addressed themselves to many critical aerodynamic problems of leaving and entering the earth's atmosphere. In combating friction, they have developed alloys that can resist the searing heat of passage at high speeds; they have made progress in getting a space vehicle back to earth; they have recovered the nose cone of an X-17 research missile that was shot hundreds of miles aloft and returned at  $2\frac{1}{2}$  times the normal reentry speed; and they have made many other noteworthy advances described in more detail in this report.

The process of translating these research advances into operational weapons will necessitate that they be developed, tested, produced, and, not least, operated and maintained by skilled personnel. In fiscal 1957, too many expensively trained skilled technicians, needed to sustain the conversion of the Air Force to the most modern weapons, were leaving the Service at a time when they were at, or approaching, their highest degree of usefulness. To make up this shortcoming, measures were enacted on an administrative level to improve living and working conditions for the dedicated men and women in service. At the same time, corrective legislation was proposed in the Congress which would elevate standards of pay based on criteria of effectiveness rather than longevity. These proposals received a gratifying response in the Congress, and hence augured future higher retention levels of the professional and technically skilled personnel whom we expect will give substance to our long-range strategy of deterrence. It is a tribute to the dedication of our uniformed personnel that despite inadequate rewards for their services, so many of them have elected to remain in the Service. But we cannot, nor have we a right to, expect to sustain and nurture our fundamental national policy on patriotism and devotion alone in the crucial years ahead.

While physical limitations and the considerations of security do not permit this report to make a full recounting of the entire range of Air Force activity during the year, it has been possible to touch upon the most important problems to include the shifting interplay of central ideas and decisions, and the many gratifying resolutions that were obtained during the year. We feel this story of accomplishment by the Air Force in fiscal year 1957 is a proud and significant one.

## II. *Combat Forces*

The remarkable advances in military technology in recent years have profoundly affected all of the armed forces. Differences of opinion among the Services over strategic concepts and development and use of weapons have occurred in a period when both the international scene and technology have been changing rapidly.

On November 26, 1956, Secretary of Defense Wilson established the responsibilities of the Services for developing and using guided missiles. Concerning air defense, he defined the Air Force responsibility to be the provision and operation of land-based surface-to-air missiles with ranges of more than 100 nautical miles for area defense. The Army received responsibility for developing and using land-based surface-to-air missiles with a horizontal range of up to 100 nautical miles for point defense. (Accordingly, the Air Force transferred the land-based TALOS interceptor missile to the Army.) The Navy continued to develop ship-based air defense weapons.

For tactical support of ground operations, Secretary Wilson directed that the Army limit the development and use of its missiles to a range of 200 miles, beyond which the Air Force would be responsible for tactical missiles. The Air Force received sole responsibility for operational use of the land-based intermediate-range ballistic missile (IRBM), and it also received confirmation of its use of the intercontinental ballistic missile (ICBM). The Navy was to continue its work on a ship-based IRBM. The Army was permitted to continue development of its IRBM JUPITER until further notice.

The second issue concerned the use of aircraft by the Army—a matter of concern to the Air Force because of its responsibility for tactical air operations in support of the Army. Efforts by the two Services to avoid duplication of forces had not been successful because of their inability to agree on the Army's use of aircraft. In his memorandum of November 26, 1956, the Secretary of Defense made a preliminary pronouncement on the subject and reaffirmed it formally in March 1957.

The Secretary specified that the Army could operate certain types of planes within the battle zone, an area extending normally about 100 miles each way from the front lines. These planes would have the following missions: Reconnaissance, observation, fire adjustment, and topographical survey; airlift of Army men and materiel; liaison, communications, and command; and aeromedical evacuation. Army aircraft were not to exceed 5,000 pounds empty, with the exception of

the helicopter, which could weigh up to 20,000 pounds empty. The Secretary would consider granting specific exceptions to these limitations. The Air Force retained responsibility for operation of aircraft to provide close combat support of ground forces, interdiction of the battlefield, tactical reconnaissance, and strategic and tactical airlift.

The problem of tactical air support was further complicated by the development of tactical missiles by both the Army and the Air Force. The Secretary of Defense stated that the integration of tactical missiles as additional weapon systems for use by Army and Air Force units called for a reevaluation of the tactical air forces programed for Army support. He asked the Joint Chiefs of Staff to recommend "specific adjustments as to the number and types of planned Army guided missile and unguided rocket units and . . . the number of Air Force tactical wings which may be eliminated as a result of these decisions."

Considerations due to international politics and the rapid advances in technology also required major adjustments in the organizational structure of the Air Force—both in Washington and the field. The establishment in Headquarters USAF of the Deputy Chief of Staff for Plans and Programs was in direct response to the tremendous increase in both volume and importance of these activities. The creation of a separate deputy to plan for the future permitted the Deputy Chief of Staff for Operations to concentrate his efforts on current operations.

In the Pacific Theater, the Far East Air Forces was redesignated Pacific Air Forces, with headquarters in Hawaii instead of Japan. All Air Force units in the Pacific—from Hawaii to Korea—came under control of the Pacific Air Forces. The major command change consolidated control in the Pacific Command. The U. S. Navy became executive agent, thus eliminating overlapping jurisdictions to which USAF units had been responsible. The removal to Hawaii was partly due to the agreement to reduce United States military forces in Japan.

Changes in key United States military positions reflected the growing stature of the Air Force. The President appointed Gen. Nathan F. Twining as Chairman of the Joint Chiefs of Staff, effective August 15, 1957. Earlier, in November 1956, Gen. Lauris Norstad of the Air Force succeeded Gen. Alfred M. Gruenther, U. S. Army, as Supreme Allied Commander, Europe. Both Generals Twining and Norstad were the first Air Force officers to be appointed to these high positions.

In June 1957 the Air Force reached its long-established goal of 137 combat wings. The achievement was actually temporary in duration because of the decisions already made to reduce both USAF manpower and wing strength, the latter to 128 and possibly lower.

The combat forces added greatly to their combat capability and steadily improved their readiness for action. With the incorporation of nuclear weapons in the air defense system in the United States during 1957, all of the Air Force's combat commands had attained the ability to use nuclear weapons. Except for B-36 and troop carrier wings, all combat units were completely equipped with jet aircraft. Increased use of Air National Guard and Air Force Reserve interceptor and troop carrier units also added to the combat capability of the Air Force.

The certainty that the United States will initially be the attacked rather than the attacker in any future war places the highest premium on instant readiness of our air units. The first and probably most decisive battle will be for control of the air. The USAF combat commands have worked unceasingly to reduce their reaction time, for they know that in a future war there will be no opportunity to recover from a Pearl Harbor. Large numbers of planes are standing by, ready to take off at very short notice. Eventually, it may be necessary to keep a number of planes in the air at all times.

### **Air Defense Command**

The problem of defending the United States from attack through the air became more acute as the capability of the Soviet Union to launch a strong attack appeared to be growing steadily. It became increasingly clear that the air defense of the United States depended on the defense of North America and perhaps of the whole Western Hemisphere.

The Air Force took major steps toward the integration of all of its air defense operations under a single command. The Air Defense Command extended its operations beyond the United States proper and was assigned direct responsibility for air defense of the flanks of the North American continent—Alaska on the west and Greenland, Newfoundland, and Labrador on the east.<sup>1</sup>

The initial mission of any air defense system is to give the earliest possible warning of an attack. The warning system started some years ago had almost reached completion by the end of June 1957. The two early warning radar networks in Canada—the mid-Canada line along the 55th parallel and the Distant Early Warning line above the Arctic Circle—were completed and in operation. These lines, in effect, extended hundreds of miles out into the Atlantic and Pacific Oceans by the use of U. S. Navy picket ships and early warning air-

<sup>1</sup> The final organizational step toward a more effective air defense of the continent occurred on August 1, 1957, when the American Continental Air Defense Command and the Canadian air defense system were placed under a single combined command—the North American Air Defense Command—with headquarters at Colorado Springs, Colorado. Gen. Earle E. Partridge was designated Commanding General, NORAD.

craft in both oceans, and USAF early warning and control aircraft operating far out at sea around the clock. One fixed radar station, in shoal waters of the Atlantic between Nova Scotia and New York, was operational at the end of June 1957.

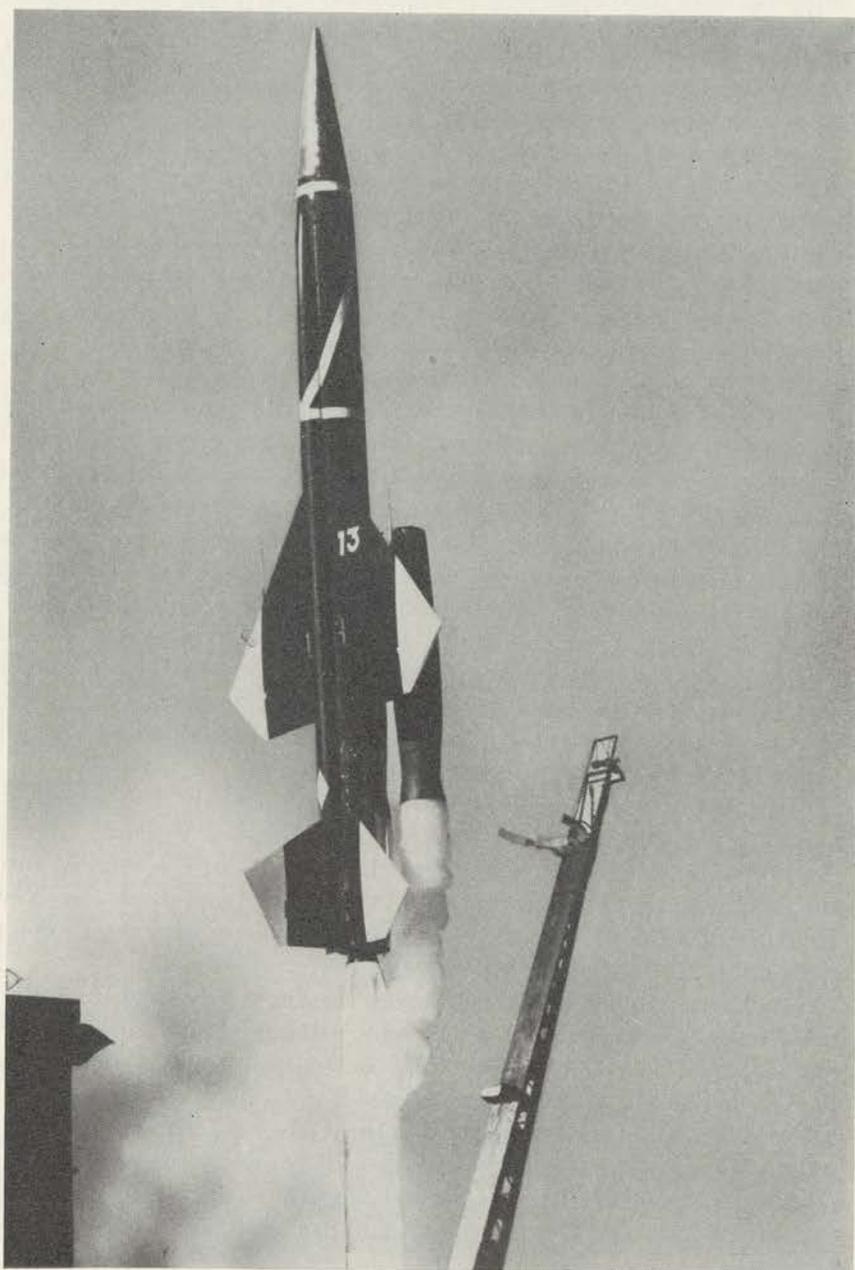
Within the United States, the Ground Observer Corps continued to supplement the radar networks. However, the advent of improved low-altitude radar and other electronic surveillance systems portended a changing role for this organization. At the end of June 1957 the Corps had 342,475 active volunteers and 170,935 reserves. The total organized observation post strength was 19,076.

The second mission of an air defense system is to destroy attacking aircraft and missiles. ADC substantially improved its capability in this direction during the year. The F-102 Delta Dagger, a powerful supersonic interceptor with a ceiling in the stratosphere, began joining ADC squadrons during the summer of 1956. The first nuclear weapon for use by interceptors—the MB-1 GENIE rocket—came into operational use in 1957.

The day-to-day strength of ADC's interceptor squadrons was augmented by units of the Air National Guard and the Air Force Reserve. As of June 30, 1957, planes of 1 AFR unit and 20 ANG units were standing daylight runway alert at fields across the country. The ANG fighters made more than 28,000 interceptions during the fiscal year. In addition, three ANG aircraft control and warning squadrons were providing 24-hour coverage and ground-controlled intercept in Hawaii and around Salt Lake City, Utah, and Denver, Colorado.

The first installation of the Semi-Automatic Ground Environment (SAGE) was undergoing testing at the end of June 1957. Eighteen technical facilities at 13 locations had been built or were under construction. SAGE's electronic digital computers are designed to replace the human senses used in gathering and transmitting information and controlling aircraft and missiles. The "automatic brain" determines the speed, altitude, and direction of the attackers, predicts their future courses in a fraction of a second, transmits the results to the defense network, and directs defending interceptors against the targets. When the SAGE facilities are completed, top commanders will be able to control the air battle on a continental scale. Men will still make the basic decisions, but they will be transmitted in detail with astonishing speed.

The major problem facing the air defense system is a means of defending the United States against attack by intercontinental ballistic missiles (ICBM). One noteworthy advance during the year was the development of radar with the ability to detect ICBM's as far as 3,000 miles away. But there still remains the imperative need to develop a missile that will be able to destroy the attacking ICBM's while still distant from us.



*Figure 1. Vertical launcher falls away from IM-99 BOMARC.*

## Strategic Air Command

The Strategic Air Command paid increased attention to its vulnerability to air attack. This problem is actually closely related to that of reaction time—the time it would take SAC to get its planes into the air and on the way to their targets.

SAC and the Continental Air Defense Command worked closely in order to fulfill the basic requirement that SAC be prepared to take to the air at the earliest possible moment after receiving warning. To this end, both commands set up a multiple communication tie-in during 1957. During this period, SAC also successfully tested a plan to keep a portion of its force on constant alert. By the end of June, the plan had been put into effect for the whole command.

Dispersal of SAC bombardment units offered the best means of reducing SAC's vulnerability to attack and at the same time reducing its reaction time. The goal was 1 heavy bombardment squadron at an air base instead of 3, as at present, and 1 medium bombardment wing instead of 2. With more bases, a larger portion of SAC's striking force would have a greater possibility of surviving a surprise attack. Three heavy bomber bases with 15 planes each would get the aircraft aloft much more quickly than could a single base housing 45 heavy bombers. During the year the chief progress toward this goal was the continuing construction of new bases begun earlier and of facilities at existing bases to permit SAC to make a beginning on this dispersal program. Actual dispersal of units had not yet begun at the end of the fiscal year.

Still another measure to increase combat capability also served, in effect, to cut down reaction time. SAC continued to move Eighth Air Force bombardment wings from the interior of the country into the northeastern United States. Taking off from bases in New England instead of Texas, the Eighth's bombers can get to their potential targets more quickly and with fewer refuelings.

The large number of oversea bases remained an integral part of SAC's strategic pattern of operations, although their vulnerability has increased in recent years. The continuing program of rotating bombardment units on a regular schedule to bases throughout the world afforded a further and most helpful means of dispersing SAC's units. The great value of these bases, of course, remained in their proximity to potential targets, which, together with aerial refueling capabilities, gave SAC great operational flexibility and a broad choice of tactics.

Since the oversea base system is vulnerable and could not accommodate SAC's full striking strength in the event of hostilities, SAC has refined the technique of aerial refueling, which will reduce its dependence on these bases and extend the range of the planes far

beyond their normal capabilities. Aerial refueling became routine to such an extent that SAC's bombers averaged more than 3,000 hookups every week. Entire wings refueled in the air during long flights. Great improvement in aerial refueling will occur when the piston-engine tankers currently in use are replaced by the faster, higher-flying KC-135 jet tankers, which began entering SAC units in June 1957. The jet tankers will permit refueling at much higher speeds and altitudes.

The effectiveness of aerial refueling as well as the potential striking power of the B-52 bomber were amply demonstrated during the year. On November 24-25, 1956, eight B-52's flew nonstop training flights from 13,500 to 16,000 miles, using the North Pole as a turning point while circling the United States and Canada. In January 1957, three B-52's circled the globe in a nonstop flight covering more than 24,000 miles in 45 hours.

Other measures to increase SAC's effectiveness included addition of new planes, new weapons, and new techniques. The B-52 continued to replace the B-36, and the Air Force considered the use of the B-58 Hustler, a supersonic bomber, as an eventual replacement for the B-47. Meanwhile, arrangements were made to equip some B-47's with the GAM-63 RASCAL, an air-to-surface supersonic guided missile that a bomber can release against a target from many miles away. Also, SAC prepared to organize the first intercontinental guided missile squadron, to be equipped with the subsonic SM-62 SNARK. Because of technological and tactical changes, 2 of SAC's 6 strategic fighter wings were eliminated, and the other 4 were transferred to the Tactical Air Command during the year. The advent of the fast B-47's and B-52's, together with changes in tactics and techniques, eliminated the need for escort fighters.

At the end of June 1957, SAC had a strength of approximately 3,000 aircraft, 50 combat wings, and some 200,000 officers and airmen. This powerful and dedicated force remains our best means of deterring a potential aggressor.

### **Tactical Air Command**

The Tactical Air Command has taken on a vastly broadened role within the Air Force. Its ability to deploy nuclear strike forces almost immediately to any part of the world has increased the deterrent power of the Air Force and has provided the United States with a potent weapon for use in local or "brushfire" wars. TAC has acquired a high degree of versatility that permits it to fight in local wars under diverse conditions, using a wide variety of combat tactics and techniques.

During this fiscal year TAC attained a degree of mobility that left no doubt of its capacity to react swiftly to military demands any-

where in the world. Composite air strike forces can be assembled to move overseas within hours of being alerted. These forces, tailored to meet the threat of a specific situation could be composed of day fighters to obtain air superiority, fighter-bombers for close support and counterairfield operations, and light tactical bombers for longer-range tactical missions. Tankers and cargo aircraft provide vital services en route to and in the combat area. The strike force, trained to operate under field conditions, is ready for combat immediately on arrival overseas. The Nineteenth Air Force, a highly mobile headquarters, has the task of assembling, deploying, and commanding these composite air strike forces.

A demonstration of TAC's mobility took place in September 1956 when the components of a composite strike force flew to Europe from the United States to participate in the NATO air training exercise WHIPSAW. A squadron of F-100C jet fighters flew 2,891 miles nonstop from Newfoundland to Morocco in a little more than 5 hours. A squadron of F-84F's flew 3,787 miles nonstop from Louisiana to Morocco in 7 hours, 39 minutes. Other components of the force, including RF-84F's and B-66's, also flew from the United States to Morocco—and from there to Germany.

The remarkable development of TAC's long reach, thanks to aerial refueling, was demonstrated once more in 1957 when a flight of F-100's flew nonstop from London, England, to the United States. Three planes landed at Langley Air Force Base, Virginia, while the others continued to Los Angeles—a distance of 7,000 miles from London.

TAC applied its principle of mobility in several joint training exercises. During Exercise CARIB EX, a test of the defenses of the Panama Canal Zone in April 1957, TAC fighter-bombers supporting the Army and Marine troops operated nonstop from a base in Texas 2,000 miles away. F-100C's took off from Foster Air Force Base at 5:00 a. m., made a simulated strike in the Canal Zone, and returned to Foster by noon. With less than 1 day's notice, a tactical bombardment squadron of 12 planes and 40 men moved from Virginia to Panama. With an average of less than 1 mechanic per plane, the squadron operated successfully under field conditions.

The Command's other major mission is to provide tactical airlift. In August 1956, Eighteenth Air Force C-124's, C-119's, C-123's, C-46's and H-21 helicopters participated in Exercise PINE CONE—a joint Army-Air Force maneuver in North Carolina designed to test the use of airborne troops under atomic conditions. The TAC planes flew assault missions and carried the airborne troops. The five reserve troop carrier wings that participated in the exercise performed with noteworthy success.

Among other airlift operations, TAC C-124's pioneered large transport missions in the Antarctic in support of the U. S. Navy's Operation DEEP FREEZE, flying from New Zealand to the South Pole. In support of International Geophysical Year activities, TAC C-124's helped airlift 1,100 tons of supplies and equipment to each of two ice islands in the Arctic. C-123's and C-119's completed a lift of almost 2,700 tons of supplies to DEW line sites, including almost 300 tons dropped from the air.

Additional modern planes and missiles added much to TAC's combat capability during the year. Nine tactical fighter wings received F-100 aircraft, and 1 wing received the powerful F-101A fighter-bomber. These Century series planes marked a jump from the subsonic to supersonic performance for TAC's fighters. The speedy B-66 Destroyer joined the tactical bomber fleet. The most important addition to the transport fleet was the C-130 Hercules, a 4-engine turboprop plane designed to carry 20 tons of equipment or 90 combat-ready troops. The Hercules has a top speed of 370 miles per hour and can fly at high altitudes. It is considered the most economical and effective tactical transport in use by the Air Force.

Development of improved versions of the MATADOR—the TM61C and the TM-76A MACE—gave TAC an all-weather tactical weapon capable of carrying nuclear and nonnuclear warheads hundreds of miles in tactical support operations. TAC formed a fifth tactical missile group, to be equipped with TM-76A's. Three missile groups were already stationed in Europe, and a detachment of a fourth group was in Taiwan at the end of June 1957.

### **Military Air Transport Service**

In accordance with a directive from the Secretary of Defense, issued in December 1956, TAC transferred to the Military Air Transport Service in July 1957 the equivalent of four groups of heavy troop carriers. With the addition of this large number of modern 4-engine transports, MATS also assumed responsibility for the troop carrier functions previously performed by these planes. At the end of June 1957, MATS had in its air fleet 1,359 planes, of which 488 were 4-engine transport aircraft.

To carry out the fuller integration of the air transport function, the Secretary of Defense (on December 7, 1956) appointed the Secretary of the Air Force as the single manager of airlift for the armed Services. This increased emphasis on MATS should strengthen the mobilization readiness of airlift for the Department of Defense and lead to greater effectiveness and economy in airlift services.

MATS successfully carried out a number of special airlifts at very short notice. In November 1956, MATS airlifted 1,306 troops and



*Figure 2. Delta Dagger, F-102A, on the ramp.*

110 tons of equipment from India and Colombia to the United Nations staging area at Naples, Italy. These troops were part of the United Nations Emergency Force placed on occupation duty in the Suez Canal area. On December 11, 1956, MATS began flying Hungarian refugees from Munich, Germany, to the United States. When this airlift ended in July 1957, MATS and its civil contract carriers had airlifted more than 14,000 Hungarians to the United States, landing them at McGuire Air Force Base, New Jersey.

Although its operations were expanding, MATS continued to achieve a lower accident rate, due primarily to an aggressive flight

safety program. The rate for all types of operations reached an all-time low of 5.12 major accidents per 100,000 flying hours in 1956. For scheduled transport operations, the rate for 1956 was 1.66 major accidents per 100,000 flying hours. This figure declined to 1.09 for the first 6 months of 1957. This excellent record led to the extension of commercial worldwide accident insurance protection to MATS crew members and passengers at regular rates on scheduled flights.

MATS continued to maintain a close relationship with the civil airlines, which carried a substantial portion of the MATS tonnage. For quick augmentation of its fleet in the event of war, MATS planned to call on the Civil Reserve Air Fleet (CRAF). A large portion of this fleet of more than 300 4-engine transports from 23 airlines was already modified, but contracts for use of the planes had not yet been signed by the Air Force and the carriers at the end of June 1957.

MATS operations during fiscal year 1957 increased a great deal over those of the preceding year. The 935 million ton-miles flown compared with 776 million in fiscal year 1956—an increase of more than 20 percent. World passenger traffic increased by 157,000—from 809,000 in fiscal year 1956 to 966,000 in 1957. Commercial contract carriers airlifted about 25 percent of the passengers in 1957. MATS carried more than 273,000 tons of passengers, cargo, and mail during fiscal year 1957, some 7 percent more than in 1956.

### **Air Traffic Control**

The rapid growth of military and civil aviation in the United States has made air-traffic control a national problem. The saturation of American airways has long been of vital concern to the Air Force, and it has worked closely with the Civil Aeronautics Administration and other Government agencies to bring about the safest and most effective use of the Nation's airspace. The USAF combat forces are profoundly affected by the pattern of air operations over the United States and the adjacent oceans.

To help the CAA in its operations, the Air Force gave CAA pilots flying training in jet aircraft. It also lent jet planes—RB-57's, F-80C's, and a T-33—to the CAA for a variety of purposes connected with air-traffic control tests. The Air Force provided financial assistance for the installation of VORTAC equipment at CAA-operated stations. This short-range navigation system gives distance measuring and azimuth information to planes in flight and is of great assistance to both military and civil aviation.

During the year the CAA and the Air Defense Command agreed on the joint operation of radars at 17 locations—7 definitely and 10 tentatively. This integration of certain air defense and air-traffic control functions was of mutual benefit to the Air Force and the CAA.

ADC gained more extensive radar coverage over the United States and filled a number of holes in our radar network with gap-filler radars.

In February 1956 the President showed his concern over the Nation's airways problem by his appointment of Edward P. Curtis as his Special Assistant to study aviation facility requirements and ways of meeting these requirements through 1975. With the help of a committee, the Special Assistant prepared a report—Aviation Facilities Planning—which was submitted to the President on May 14, 1957. Because of the important implications of such a study for military aviation, the Air Force maintained close liaison with the committee and assisted it in its work.

### III. Personnel

The Air Force maintained its military strength at substantially less than the manpower ceiling of 975,000. The number of military personnel increased slightly during the year—from 909,958 to 919,835, including 140,563 officers and 779,272 airmen.

The Air Force sought to overcome its most pressing personnel problem—how to keep its trained and experienced officers and airmen—by making every effort to increase the attractiveness of a Service career. It emphasized more and better housing facilities, dependent medical care, improved survivor benefits, and personalized counseling by commanding officers and supervisors of men whose enlistments were about to expire. In particular, the Air Force tried to insure that family housing was available on a base before personnel were assigned. Although budget restrictions handicapped this program, in fiscal year 1957 a larger portion of USAF military construction funds were devoted to building new housing than the year before. While these efforts will undoubtedly be reflected in the retention rate for skilled personnel, both officer and airman, it is believed that new legislation will be necessary to correct prevailing inequities, particularly in the military pay scale.

The Air Force cooperated during the year with the Defense Advisory Committee on Professional Compensation (Cordiner Committee), which recommended in May 1957 a complete revision of the pay system for military personnel. The Cordiner Report called for elimination of the rigidity and compression in the pay structure by providing for "step in grade" merit pay increases to replace the existing longevity pay increases and by providing two additional pay grades for both officers and enlisted men. It also recommended that pay be adjusted throughout the structure to provide returns more commensurate with those received by specialists of comparable qualifications in civilian life. The Air Force felt strongly that adoption of the proposals by the Congress would greatly alleviate the personnel retention problem.

#### Retention and Recruitment

During fiscal year 1957 the Air Force recruited almost 100 percent of its quota of 106,633 new airmen, but only a few of these possessed the technical skills badly needed by the Air Force. Fewer recruits in the lowest intelligence group were taken. The Air Force also exceeded its expectations in reenlisting airmen, both those who had been out 90 days or less and those whose enlistments had ended more

# USAF MILITARY STRENGTH

(REGULAR AND RESERVE FORCES)

30 JUNE	1956	1957
U. S. AIR FORCE	909,958	919,835
AIR FORCE RESERVE	338,731	421,898
AIR NATIONAL GUARD	63,534	67,950

Figure 3.

than 90 days previously. This was achieved in spite of the tightening on August 15, 1956, of eligibility requirements for former members of other Services and, on January 1, 1957, for former airmen. About 3,800 people without previous service enlisted in the reserves.

In the budget program for fiscal year 1957 the Air Force estimated that the reenlistment rate would be 33.6 percent, but measures taken to make the Service more attractive helped raise the overall rate to 49.4 percent for the year, with rates of 36.5 percent for first-term airmen and 91.4 percent for career airmen. Although gratifying, these rates, like those of the preceding year, were considerably inflated because airmen who were eligible for separation during fiscal years 1958-60 were permitted to be discharged and reenlisted prior to their normal date of separation. Approximately 30,000 airmen, or about 35 percent of all those who reenlisted, fell into this category. Nearly all of the airmen reenlisting under the short discharge policy elected a 6-year contract, thus contributing greatly to the stability of the Air Force. Despite these favorable developments, too many airmen in the highly technical and critical skills continued to leave the Service. The Air Force and the Department of Defense studied methods for correcting this situation.

The Regular Officer Augmentation Act of July 20, 1956, raised the authorized strength of Regular officers in the Air Force from 27,500 to 69,425. This law permits the Air Force to give career status to a much larger number of its active-duty reserve officers, thus mitigating one of the most serious morale problems in the officer corps. Approximately 60,000 applications for integration into the Regular Air Force had been received by the end of the fiscal year, and these were being considered by selection boards.

## Assignment

Under a policy established in 1952, the Air Force rarely approved voluntary requests for suspension from flying status but in 1957 most

# USAF ACTIVE DUTY STRENGTH AS OF 30 JUNE

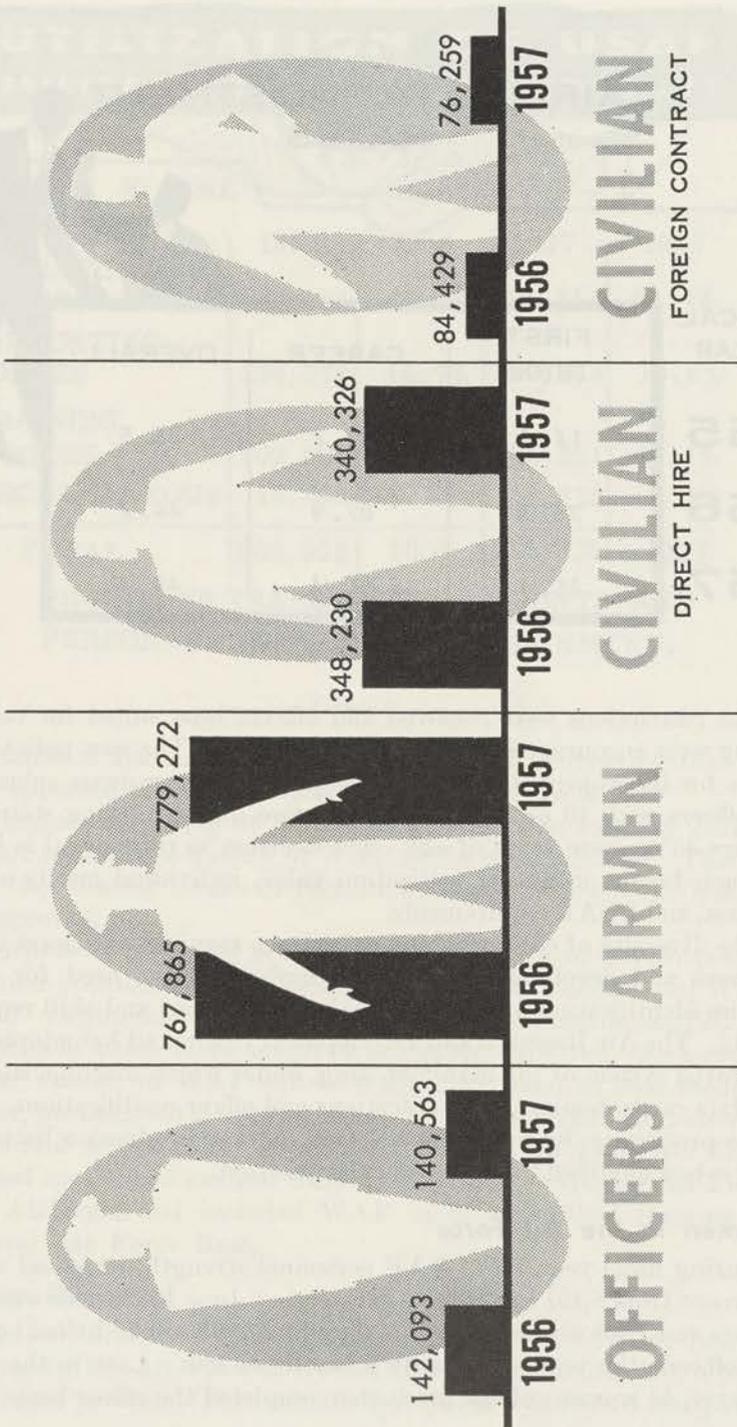


Figure 4.

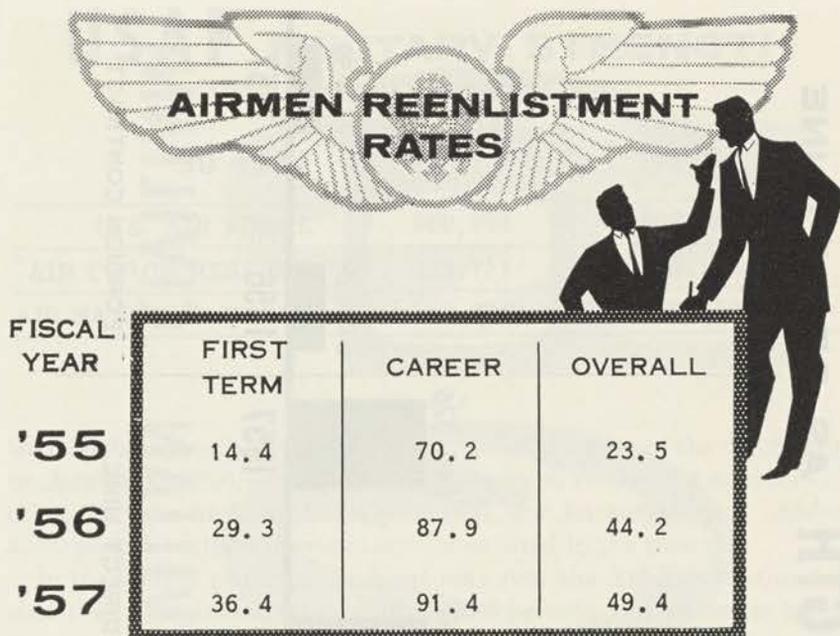


Figure 5.

of the restrictions were removed and officers least suited for tactical flying were encouraged to submit such requests. The new policy provides for the approval without prejudice of most requests submitted by officers with 10 or more years of active duty on flying status, or officers 35 or more years of age. The decision as to removal is based on such factors as future utilization value, individual merits of the request, and USAF requirements.

The diversity of education and experience required of officers in the research and development area has emphasized the need for more precise identification of both personal qualifications and skill requirements. The Air Research and Development Command has adopted an improved system of job-man matching, under which machine statistical-data cards itemize job specifications and officer qualifications. Machine processing, by matching the two, quickly produces a listing of officers best qualified for any particular position.

### Women in the Air Force

During fiscal year 1957, WAF personnel strength decreased about 5 percent from 8,491 to 8,093. At the end of June 1957 there were 635 officers and 7,458 airmen. Despite the effort to obtain additional qualified officers, the year ended with a small net loss. Late in the year, however, 44 women college graduates completed the officer basic mili-

## UTILIZATION OF USAF MILITARY PERSONNEL (1956 - 7)

AS OF 30 JUNE

	1956	1956	1957	1957
OPERATING FORCES	547,544	60.2%	595,551	64.7%
SUPPORTING FORCES	134,072	14.7%	127,063	13.8%
TRAINING FORCES	209,001	23.0%	178,851	19.4%
MISCELLANEOUS	19,341	2.1%	18,370	2.1%
<b>TOTAL</b>	<b>909,958</b>	<b>100%</b>	<b>919,835</b>	<b>100%</b>

\*INCLUDES TRANSIENTS, PATIENTS AND PERSONNEL ON SPECIAL ASSIGNMENT.

*Figure 6.*

tary course at Lackland Air Force Base, Texas, indicating that the direct appointment program was beginning to bear fruit.

Centralized screening of WAF recruits began in January 1957 in an effort to raise the quality of WAF to the required level. This reduced the monthly intake of recruits by about half, but the quality was improved.

A surplus of personnel in certain specialties where women possess particular aptitude caused difficulty in the proper placement of WAF airmen. Beginning in late 1956 the major commands studied all specialties in which WAF might be profitably employed. As a result, a larger number of WAF will be trained and used in such fields as weather, medical, dental, statistical and machine accounting, aircraft control and warning, and supply. In January 1957 the Air Force reopened specialized medical training for WAF at Gunter Air Force Base, Alabama, and included WAF in basic medical training at Lackland Air Force Base.

### Civilian Personnel

From July 1, 1956, to June 30, 1957, the number of civilians directly employed by the Air Force decreased from 348,230 to 340,326, a little more than 2 percent. This reduction, required by lowered manpower

ceilings, occurred within the continental United States. Only 44 percent of the directly hired civilians were salaried (classified) employees, while 56 percent were hourly wage earners. Overseas nearly two-thirds of the workers hired directly by the Air Force came from local areas. In addition to about 27,000 hired directly, the Air Force had the services of more than 76,000 foreign nationals under contracts or agreements with other governments.

At the end of the fiscal year, 97 percent of the civilian workers in the continental United States held career or career-conditional appointments, as compared with approximately 40 percent permanently employed when the new career program began in January 1955, and an increase of 3 percent over last year's figure. The high proportion of career employees should result in lower recruiting and training costs and in greater efficiency on the job. Overseas, 65 percent of the American citizens employed held career or career-conditional appointments, representing a fourfold increase over the April 1956 figure of 16 percent. This improvement was largely a result of the oversea conversion program, authorized by executive order and carried out between April and October 1956. This program, together with previous measures, brought into the competitive civil service all areas outside the continental United States except the Isthmus of Panama. Besides increasing stability, the program will facilitate the interchange of employees between domestic and oversea assignments.

To attract career employees into the oversea service, the Air Force worked on a plan to guarantee reemployment rights to those accepting and satisfactorily completing an oversea tour. To accomplish this objective would require a new law, a proposal for which was included in the Air Force legislative program for fiscal year 1958.

Although Air Force civilian turnover remained below that of general manufacturing industries and of the Federal Government as a whole, there was a relatively high resignation rate for salaried employees, especially in the scientific, professional, and technical fields. Studies were made during the year to analyze and correct the causes of such resignations.

A 2-week institute on management development, perhaps the first of its kind in the Federal Government, was held at the USAF School for Civilian Personnel Administration, Maxwell Air Force Base, Alabama. The institute was attended by 58 students, and an additional 46 management representatives were present for the last 2 days, including guest speakers from the top levels of administration and management throughout the country.

The Air Force broadened its executive training program by sending key civilians to educational institutions for special courses. During the year, 526 civilians attended 41 different courses, averaging 3.25

weeks in length. Several USAF installations cooperated with educational institutions to have courses presented in their immediate localities, thereby eliminating or greatly reducing travel and subsistence costs.

The management course for Air Force supervisors continued to achieve wider range, with institutes to qualify instructors being conducted in both Europe and the Far East. In the United States, the Air Materiel Command also developed a 30-hour management course for crew chiefs, gang bosses, and other supervisory workers and the course is now being adapted for use throughout the Air Force.

To ease the shortages of scientific and technical personnel, the Department of Defense provided for the establishment of cooperative training programs in which technical students in colleges might alternate periods of work at military installations with college study. Some Air Force installations began such programs during the year. Also during the year, 456 technical, scientific, and engineering employees attended 83 contract courses.

The apprenticeship program at 10 installations helped in part to maintain the supply of skilled craftsmen, with 151 apprentices completing training during the first 6 months of 1957. Air Training Command and Army and Navy schools continued to qualify instructors in technical trades and crafts.

During fiscal year 1957, the Air Force realized more than \$32 million in first-year benefits through its employee suggestion program. More than 28 percent of the employees participated in the program, and cash awards totaling \$944,623 were paid for 22,605 adopted suggestions. More than 8,800 employees received recognition for superior work or special acts or services under other provisions of the incentive awards program.

## **IV. Military Training**

The Air Force flying training program remained quite stable during fiscal year 1957, with a small decline in the production of new pilots as a result of a decision to lower the pilot-aircraft ratio for most types of planes. Training of experienced pilots to fly more advanced planes continued to be emphasized, particularly in the reserve forces, where a large-scale conversion to jet aircraft was under way. A marked upturn in advanced training for officers, as conducted by the Air Force Institute of Technology, was apparent. In the reserve forces the most important trend was the effort to increase the ready capability of certain units in support of active USAF missions.

### **Flying Training**

During fiscal year 1957 the Air Force graduated 5,858 trained pilots as compared with 6,251 for the preceding year. Of the 1957 graduates, 5,333 were for the USAF, 407 for the Air National Guard, and 118 for foreign nations. The training output of navigators increased slightly, from 2,555 to 2,791. The reduction in pilot training resulted from a decision to lower the ratio of pilots per fighter-bombers, other bombers, and interceptors. In accord with this reduction, the Air Training Command scheduled 2 of the Air Force's 9 primary contract schools—Marana and Stallings Air Bases—for termination after June 1957. The single-engine training program at Laughlin Air Force Base ceased in April 1957.

The principal sources of new pilots for the Air Force continued to be the Air Force Reserve Officers Training Corps, Air Force officers who applied for pilot training, and aviation cadets, in that order. To maintain a steady flow of flight candidates from the AFROTC, the quotas of the other two categories were reduced. But 4,400 applications from the AFROTC in fiscal year 1957 were in excess of the assigned quota of 3,800. This problem would be intensified in fiscal year 1958 when the reduced pilot-to-aircraft ratio would further reduce the AFROTC quota to 3,300.

To reduce the AFROTC entries for pilot training, the Air Force required all senior candidates to choose among three plans: (1) A 5-year tour with priority for call to active duty, assignment, and a choice of base; (2) continuance under the current contract with a 3-year duty obligation; and (3) active duty in a nonrated status. The Air Force expected that enough graduates would choose the third option to materially reduce the number of applicants for pilot training and that a large percentage of the pilot applicants would choose the 5-year tour.

## FLYING TRAINING GRADUATES

	FY 1956	FY 1957
PILOTS	6,251	5,858
USAF	5,701	5,333
OTHER (ANG, MAP, etc.)	550	525
NAVIGATORS	2,601	2,863
USAF	2,555	2,791
OTHER (ANG, MAP, etc.)	46	82

Figure 7.

The results, however, were disappointing as 27 percent accepted the 5-year tour, 64 percent retained the 3-year contract status, and 9 percent chose nonrated status.

The number of applicants for both USAF officer and aviation cadet pilot training exceeded quotas. During the year 660 officers entered into the training program, but there remained a backlog of 1,007, almost the same as existed at the beginning of the year. Of these, 933 were already rated as navigators. The backlog of aviation cadets was kept within manageable proportions by the use of a monthly quota system. Even here the backlogs at the end of the year amounted to 1,096 for pilot training and 502 for navigator training, sufficient to supply all classes in both categories through fiscal year 1958. In this situation only the best-qualified were selected, the majority having at least 2 years of college and the remainder being well-qualified high school graduates.

Flight instruction was introduced into the AFROTC curriculum at selected colleges, an innovation authorized by Congress in August 1956. Contracts were let with 41 institutions for 35 hours of instruction per man for about 1,250 cadets. During fiscal year 1957, civilian contract instructors gave 37,275 hours of actual flying instruction.

Another important advance was the delivery of the first group of primary jet trainers—11 T-37's—to the Air Training Command in 1957. The first primary jet students, 20 officers, were to receive instruction at Bainbridge Air Base, Georgia.

## Technical and Basic Training

The concept of "field training" was successfully tested in three major air commands during the year. Essentially, this training was of a specialized type directly connected with the job to be performed. Such techniques as mobile training detachments and on-the-job training were employed.

Specialized training sacrificed some flexibility in range of performance but the technician was more productive during his first enlistment. Hence there was some return to the Air Force for the investment in cases of technicians who failed to reenlist.

In 1957 all basic training was concentrated at Lackland Air Force Base. This process of consolidating basic and some technical training was aided by a somewhat reduced schedule for enlistment of airmen with no prior service. The instruction of noncommissioned officers was improved and standardized. In January 1957, the Air Force prescribed standard curricula for two courses: An NCO preparatory course and a senior NCO academy course.

To ease the shortage of supervisors in critical technical areas, the Air Force established in January 1957 a special retraining program for higher-rated noncommissioned officers qualified in less critical technical skills. After retraining in technical schools, volunteers are given accelerated on-the-job training to qualify them for new supervisory duties in the shortest possible time. By the end of the fiscal year, 4,505 applications for this retraining had been approved. Twelve percent of the applicants were master sergeants, 39 percent technical sergeants, and 40 percent staff sergeants. The current quota of 6,908 is expected to be reached by December 1957, at which time it will probably be increased.

Altogether the Air Force graduated 111,649 airmen from its organized training schools during the year. They were classified as follows: Highly technical—31,876; technical—59,875; semitechnical—11,748; nontechnical—8,150.

## Professional Education

### *Undergraduate*

The Air Force Reserve Officers Training Corps continued to be the principal means of training new officers. At the beginning of the 1956-57 scholastic year the 99,434 cadets included 55,256 first-year, 31,837 second-year, 5,681 third-year, and 6,660 fourth-year students. During the period from May 1, 1956, to April 30, 1957, a total of 7,345 graduates were commissioned as reserve officers in the United States Air Force. Of these, 4,363 had applied for pilot training, 1,641 for navigator training, 1,214 for nonrated status, and 127 were veterans with no active duty requirement.

During the year the Committee on National Defense of the American Association of Land Grant Colleges and State Universities asked the Department of Defense to state its attitude on the need for compulsory basic ROTC (first 2 years). Although not required by Federal law or any policy of the Air Force, 91 of the 179 institutions in the AFROTC program enforced such a requirement. The elimination of the compulsory requirement for the basic courses would have only an insignificant effect on advanced enrollment, and the Air Force was willing to leave the question of a mandatory requirement to the institution.

The introduction of flying instruction into selected institutions during the year marked a most important step to improve training in the AFROTC. The training, consisting of 35 hours of light plane instruction, will be given at no cost to the cadet and will be a standard feature of the ROTC course. Besides arousing greater interest in the course and in flying, the training will allow screening of cadets under most realistic conditions prior to graduation and commissioning.

Two other major sources of new officers for the Air Force were the aviation cadet training program and the Officer Candidate School, which continued to operate at Lackland Air Force Base. The aviation cadet schools trained 1,583 new officers, all qualified in a flying specialty, and the Officer Candidate School graduated 447 new nonrated officers, including 20 WAF. Because of the growing need for officers with technical training, the Air Force adopted a new system to obtain more OCS trainees with technical abilities.

The Board of Visitors of the Air Force Academy reported favorably on the Academy's progress during the first 2 years of operation. The Academy planned to move from its temporary location near Denver to its permanent site near Colorado Springs in September 1958, when the first graduating class will be in its senior year. With the entrance of the second class in July 1956 the number of cadets increased by 300 to 548. After removal to Colorado Springs the enrollment will be expanded gradually to the 2,496 authorized.

#### *Graduate*

The Air Force system of advanced education for its officer corps continued to consist primarily of four institutions under the Air University—the Air War College, essentially limited to selected colonels; the Air Command and Staff College, for experienced officers of lower grades; the Air Force Institute of Technology, for the advanced education of Air Force officers in scientific, technical, managerial, and other specialized areas; and the Extension Course Institute, for the education of Air Force regular and reserve officers in a wide variety of subjects. In addition to these, selected officers attended the three interservice institutions—the National War College, the Indus-

trial College of the Armed Forces, and the Armed Forces Staff College, as well as schools of the other Services.

For the first time in its history, the student quota for the Institute of Technology was filled 100 percent, largely as the result of an intensive effort to bring the programs and courses to the attention of Air Force officers. The feasibility of further expansion of the Institute's program in various scientific and technical areas was also explored. The Institute maintained a highly flexible program, operating both through a resident course given at Wright-Patterson Air Force Base and through a much larger program administered in cooperation with numerous American colleges and industries.

The enrollment of the Extension Course Institute also continued to increase, with over 188,000 students registered for 82 courses. USAF civilian personnel, previously denied permission to enroll because of limited facilities and heavy military enrollment, were allowed to take courses related directly to their job assignments.

### Reserve Forces

At the end of June 1957, Air Force Reserve (AFR) personnel totaled 421,898, including 137,815 officers and 284,083 airmen, representing an overall increase of more than 75,000 over the previous year. Nearly 218,000 of these were classified as Ready, but only 148,000 were listed as having received training during the year, some 157,000 less than the preceding year. The drop was more apparent than real, however, because of the transfer of large numbers of active reservists without mobilization assignments to the inactive (Standby) category. Air National Guard (ANG) strength amounted to 67,950, including 8,033 officers and 59,917 airmen—an increase of almost 4,500 over June 30, 1956.

During fiscal year 1957 enlistment began under the Armed Forces Reserve Act of 1952, as amended in 1956. Under this act an applicant between the ages of 17 and 18½ may enlist for an Air Force Reserve vacancy, assume an 8-year obligation, spend 6 months on active duty, and participate actively for 7½ years in the Ready Reserve. On March 19, 1957, the age limit was raised to include men from 18½ to 26 years of age. This second group assumes a 6-year obligation, spends 6 months on active duty, and participates actively for 5½ years. By June 30, 1957, about 3,800 men had been enlisted under this program.

The inability of the Regular establishment to provide adequate support forced some curtailment of the reserve program. All Replacement Training Squadrons, which served as a pool from which pilots for organized flying could be drawn, were inactivated. Also, 14 scheduled Air Reserve Centers had to be dropped from the program.

Despite these difficulties, both the AFR and the ANG made consider-



Figure 8. Hustler, Convair B-58 supersonic bomber.

able progress toward their authorized goals of 24 and 27 combat wings respectively, plus 3 support squadrons for the AFR and 9 support squadrons for the ANG. Although the combat wings were in various stages of operational readiness, all were functional in some degree. During the year, the ANG shifted further toward an air defense mission with the conversion of two tactical bomb wings to fighter interceptors. As of June 30, 1957, 20 units of the ANG and 1 of the AFR were standing daylight runway alert. In addition, ANG aircraft control and warning units were providing radar coverage at each of 3 important locations. The Air Force Reserve also shifted toward a troop carrier role with five of its tactical wings converting to troop carriers. To support the normal training and the new operational auxiliary roles being played by these civilian components of the Air Force, the number of aircraft on hand rose to 824 (573 piston type and 251 jet) for the AFR, and 2,176 (366 piston type and 1,810 jet) for the ANG.

Another operational auxiliary role was undertaken by Air Force Reserve troop carrier units in support of TAC. In Operation SWIFT LIFT, nine AFR aircraft and crews provided TAC with round-the-clock cargo and personnel airlift support.

In line with the objective of making the reserve as ready as possible without actually calling it into active service, the Air Force secured final approval of the Air Reserve Technician Plan in June 1957. This

important program gave permanent employees in the AFR flying wings a combined civilian and reserve-duty status. Under the plan an average of 435 full-time career civilian positions were established as the hard core (approximately 20 percent) of each wing. As the plan got underway, the air reserve technicians were to perform their duties during their regular civilian work week, train other personnel during their reserve military duty on weekends and summer active-duty tours, and be immediately available and fully qualified to assume their military duties in the event of mobilization.

Mission changes and modernization programs led to extensive conversion of tactical units within the AFR and the ANG to more recent types of aircraft. In the AFR, 11 wings were converting to C-119 aircraft, 2 were converting to C-46's, 6 were converting to F-86H's, while only 5 were left unchanged with existing aircraft. The ANG continued to convert to more modern aircraft, such as the F-86D, F-89D, and F-84F. Because of the shortage of facilities for advanced jet training, the transitional training of pilots remained a major problem. By using active-duty instructor pilots to check out reservists, the AFR was expected to reach a satisfactory stage of combat capability by the end of the 1958 summer active-duty training. The ANG has also established its own advanced pilot training program at home stations so that pilots for the new jet aircraft may become combat ready.

The ANG operated two programs for raising the technical proficiency of the individual officer and airman. Schools of the active military establishment provided formal technical and professional training beyond the capability of the individual units. During the year, 575 officers and 1,129 airmen completed technical school courses, after which they returned to their home units and conducted training classes based upon the knowledge gained at the school. During March the National Guard Bureau of the Army and Air Force established a voluntary extended training program for nonprior service airmen who train in a Federal active-duty status while participating. The 6-month program normally consists of basic military training, with subsequent entry into a basic technical course. If the combined basic and technical courses total less than 6 months, the airman returns to his home unit for full-time on-the-job training for the remaining time.

## V. Health and Welfare

Previous legislation to increase dependent medical care, and to provide additional retirement, survivor, and other benefits helped USAF families to improve their living standards at airbases and their relations with nearby civilian communities. In 1957, more Air Force construction funds were devoted to workshops and libraries. A modernized recreation program also provided for children's activities, all levels of sports competition, entertainment, hobbies, crafts, aero clubs, family picnic areas, and a wide variety of special interests. Many of these activities were carried out in close cooperation with civilian organizations. Off-duty education expanded, the enrollment of military personnel in study courses increasing by 15,000.

The education of a large number of dependent children overseas remained a particular problem for the Air Force. For the 1957-58 school year, educational advisers expected an enrollment of 49,000 children in oversea schools—37,000 in 93 elementary and 22 high schools operated by the Air Force and 12,000 in Army, Navy, or contract schools.

### Medical Services

#### *Health in the Air Force*

Again, during calendar year 1956, the Air Force achieved an excellent record of health. The annual rate of admissions to medical facilities for treatment dropped to 249 per 1,000 average strength. The daily noneffective ratio, showing the number of USAF persons out of every 1,000 not available for duty because of medical reasons, fell to 9.2. The daily ratio of personnel occupying hospital beds went down to 8.0 per 1,000. Out of an average military strength of 917,247, an average of 7,368 occupied hospital beds daily. Injuries continued to be the largest cause of deaths in the Air Force. Out of a total death rate of 2.14 per 1,000 average strength, injuries accounted for 83 percent (1.79 per 1,000) and diseases for 17 percent (0.35 per 1,000). Aircraft accidents caused 34 percent of the deaths resulting from injuries, while motor vehicle accidents accounted for 32 percent.

The Medical Service studied the causes of manpower losses due to illness of any kind in order to improve methods of prevention and control of illness. Using 1956 data, it developed information relating to the durations of specific illnesses and the distribution of illnesses according to functional assignment of personnel, especially those assigned to generally similar activities such as training, maintenance,

research, transportation, or testing. Most illnesses among USAF personnel were of short duration.

In aviation medicine the Air Force expanded physiological training of flying personnel to include units at 66 USAF installations, an increase of 15 over last year. There were 48 altitude chambers in use, and 10 units were equipped to conduct partial-pressure-suit training. A total of 51,204 aircrew members completed physiological training, 455 partial-pressure-suit training, and 7,029 ejection-seat training.

Preventive medicine research included special studies on influenza, noise, sanitary engineering, health education, and special weapons defense. The last involved biomedical projects carried out at atomic test sites. To protect the human ear from the noise hazard of jet aircraft and guided missiles at air bases, the Air Force developed criteria for evaluating exposures to noise and required periodic surveys of hazardous noise areas to determine where protective devices were to be worn.

### *Medical Careers*

For the first time since its establishment in 1949, the USAF Medical Service received more applications for commissions than it had spaces to fill. In view of the improvement in the military Services, in June 1957 Congress replaced the doctor draft law with a new act that gave the President authority to issue special calls through the Selective Service System for doctors, dentists, and allied specialists to serve in the armed forces. Nevertheless, there remained the problem of retaining enough professional members in the Regular Medical Service so that turnover would not lower professional standards.

Interest in medical careers increased following the 1956 legislation that provided additional bonus pay for doctors and dentists. Other inducements included incentive programs set up for military and civilian medical interns, dental interns, and senior medical and dental students. Through the Department of Defense residency training deferment program, the Air Force received at the end of June 1957 an allotment of 1,275 intern physicians, most of whom applied for reserve commissions and residency training in medical specialties. The Air Force also selected 435 dental officers for the active reserve from an allocation of 690 in addition to the 75 sponsored in the senior dental student program. The junior medical student program was discontinued after its first academic year, 1956-57, and the 150 students were carried into the senior medical student program to make a total of 164 in 1957-58.

The total officer strength in the Medical Service on June 30, 1957, was 10,540, including 3,167 physicians, 1,937 dentists, 2,902 nurses, 2,077 medical service officers, 141 medical specialists, and 316 veterinarians. Medical airmen numbered 25,191. The new Regular officer

## BEDS OCCUPIED IN USAF HOSPITALS

CALENDAR YEARS 1951-1956

PER CENT OF BEDS OCCUPIED BY —

YEAR	ALL PATIENTS	AIR FORCE PATIENTS	ARMY, NAVY & MARINES	MILITARY DEPENDENTS	OTHER * PATIENTS
1951	9,482	74.6	11.1	12.9	1.4
1952	11,170	74.3	8.0	15.9	1.8
1953	10,776	71.2	7.1	19.6	2.1
1954	10,133	68.1	6.8	22.9	2.2
1955	10,210	66.2	6.0	25.3	2.5
1956	9,608	60.9	5.9	30.2	3.0
JAN to JUN 1957	9,513	62.8	5.5	28.2	3.5

\* Includes military personnel on short tour of duty; retired military personnel; and beneficiaries of Veterans Administration, U. S. Bureau of Employees Compensation, U.S. Public Health Service, etc.

Figure 9.<sup>1</sup>

authorizations announced in May 1957 allocated spaces to the Medical Service for 2,000 physicians, 1,000 dentists, 1,000 medical service officers, 1,200 nurses, 150 veterinarians, and 80 medical specialists. The administrative manning ceiling, however, set goals at four-fifths of these figures.

The Air University has conducted specialized medical training courses for airmen at Gunter Air Force Base, Alabama, since January 1951. This year, at Lackland Air Force Base, airmen were offered an 8-week course that combined basic medical training with basic military training. The first class began in November 1956. Upon completion of the course, airmen who were selected for the Medical Service were qualified as medical helpers and assigned to attend specific apprentice-type courses at Gunter or directed to duty posts. Ultimately every medical airman will be trained in emergency care and treatment of patients.

<sup>1</sup> The "All Patients" represents the daily average number of beds occupied.

# MORTALITY

**AIR FORCE  
PERSONNEL  
WORLDWIDE**



**TOTAL NUMBER - 1,967**

**RATE PER 1000 STRENGTH 2.14**

**TRAUMATISMS, 83 PERCENT, RESULTING FROM**

• AIRCRAFT ACCIDENTS	34%
• MOTOR VEHICLE ACCIDENTS	32%
• FIREARMS ACCIDENTS	6%
• FALLS AND ATHLETICS	2%
• ALL OTHER INJURIES	9%

**DISEASES, 17 PERCENT.**

*Figure 10.*

Designation of the Secretary of the Navy as the single manager for medical supply required many changes in the supply system. Emphasis shifted from a wholesale-retail management of materiel resources to retail operations. On April 1, 1957, Air Force inventories amounting to \$46 million were transferred to the control of the Secretary of the Navy. This included all USAF depot assets except \$9.2 million in mobilization materiel in continental United States depots.

### *Hospitals*

Nine new USAF hospitals were completed during the year as replacements for World War II cantonment hospitals. Among the total of 41 new medical facilities were also 8 dispensaries, 19 dental

clinics, and 5 other facilities. One of the new contracts awarded was for the new School of Aviation Medicine at Brooks Air Force Base, Texas.

In June 1957 there were 133 USAF hospitals, 91 in the United States and 42 overseas. Total inpatient facilities numbered 202. The Air Force had 416 fixed dental facilities in operation and 36 trailer-mounted dental clinics. Under construction were 19 hospitals and 4 dental facilities. At the end of June 1957 the Joint Commission on Accreditation of Hospitals had accredited 45 USAF hospitals.

At the close of June 1957 the total number of hospital and dispensary beds was 13,892, of which 3,622 were in oversea facilities. At this time, Air Force hospitals were caring for 81.5 percent of all USAF patients. In calendar year 1956, this percentage was 79.4, a drop of 4.6 compared with 1955. The reduction after 1955 resulted from stricter adherence to Department of Defense directives for joint utilization of military hospitals.

The Dependent's Medical Care Act went into effect in December 1956, bringing increased medical service to Air Force families through the use of civilian medical facilities. The use of civilian facilities became relatively stabilized at an early date in 1957. In calendar year 1956 the average number of nonmilitary patients (which were mostly dependents) occupying beds in Air Force facilities made up more than 33 percent of the total number of patients.

#### *Aeromedical Evacuation*

A new procedure improved the aeromedical evacuation system by reducing the length of patient stay at a port-of-debarkation medical facility from an average of 5 days to 36 hours. This procedure involved medical coding of patients by the last overseas medical facility prior to departure for the United States. In June 1957 more than 50 transport aircraft were engaged in aeromedical evacuation within the United States and overseas.

Casualty staging units assisted the medical teams in the evacuation of patients. A casualty staging activity was established at Brooks Air Force Base, Texas, and at air bases in Germany, France, Korea, Japan, and Okinawa. A casualty staging element was also included in the organization of the 1st Aeromedical Evacuation Group, formed by TAC in March 1957. In peacetime, this group evacuates patients during special emergencies and supports joint maneuvers and exercises.

#### **Air Force Chaplains**

The importance of moral leadership in the Air Force was outlined during the spring of 1957 in a new lecture series to be conducted by the

chaplains of the Air Force. Called "Dynamics of Moral Leadership," these lectures were designed to keep officers and airmen aware of those principles of moral leadership that are essential to the fulfillment of the Air Force mission.

Chaplains and civilian clergymen conducted a series of Protestant and Catholic preaching missions for USAF personnel and their families in the areas of the Northeast Air Command and the Far East Air Forces. Torah convocations were conducted in the same areas for Jewish personnel.

The Air Force arranged spiritual retreats for Protestant and Catholic chaplains both in the United States and overseas. It also planned spiritual life conferences for Protestant personnel and their families in both the eastern and western parts of the United States. During National Youth Week, in the fall of 1956, closed retreats were held for Catholics in the Air Force.

The Women of the Air Force organized additional chapters of their religious-social societies at USAF bases. These societies, called Lisieux (Catholic) and Pi Chi Sigma (Protestant), sought to provide opportunities for personal spiritual growth and to give strength and direction for constructive group action.

There were 1,186 chaplains on active duty with the Air Force at the end of June 1957, only 14 fewer than the number authorized. The new Regular officer authorization for the Air Force allocated 675 spaces to the chaplains. During the year, 136 civilian clergymen were appointed or reappointed as auxiliary chaplains to supplement the military chaplains.

In the fiscal year 1957 program, Congress authorized the construction of 11 new chapels in the United States and 4 overseas, 6 of the total to include religious education wings. The Secretary of Defense approved construction of previously authorized religious facilities at 23 USAF bases in the United States and 10 overseas. In June 1957, 466 chapels were in use at Air Force bases worldwide, and 46 were under construction.

### **Judge Advocate General**

The problem of retaining young lawyers on active duty in the Air Force remained a critical one. The Judge Advocate General's Department lost 329 experienced officers during the year. Since the Judge Advocate General is the legal adviser to the Chief of Staff and his department acts as the law office for one of the Nation's largest organizations, this high turnover of judge advocates is a serious problem. The Air Force reopened a direct appointment and recall program for fiscal year 1958, and it stressed the need for career incentives, providing assistance in career development and an assignment sys-

tem that allowed 1-year advance notice before transfer to a new post.

The Boards of Review handled 3,070 court-martial cases during the year. Of these, 443 were appealed by the accused to the United States Court of Military Appeals; 45 petitions, including some from previous years, were granted. In 6 other cases, the Judge Advocate General submitted the legal question involved to the Court for its decision. The Court reversed the Boards of Review in 16 cases and sustained them in 13; another 71 cases had not yet been decided at the end of the year.

The Office of the Judge Advocate General received 8,273 claims in the amount of \$3.1 million and closed 7,213 in the amount of \$2 million. It also received a total of 398 civil suits against the Government and closed out 242 cases. There were 790 civil cases on hand as of June 30, 1957.

### **Ground Safety**

The Air Force received the first annual President's Safety Award for calendar year 1955, presented at the White House on April 10, 1957. The President established this award in 1954 to further civilian accident-prevention programs in all Federal agencies. The award to the Air Force was based on such performance criteria as reductions in injury costs, support of safety programs, application of safety programs, effective accident reporting, and support of field Federal safety councils.

For the seventh consecutive year, the Air Force won the National Safety Council's Award of Honor for reduction of ground accidents during 1956. This award for all-round ground safety achievement was based on a comparison of the 1956 accident experience with the 2 previous years. The principal factors considered were on-duty accidents to civilian employees; on- and off-duty accidents to military personnel, including accidents in privately owned vehicles; Government-owned vehicle accidents; and ground accident costs per capita. Forty-nine USAF organizations, including major air commands, numbered air forces, and bases, received similar National Safety Council awards.

Private automobile accidents caused the highest percentage of ground injuries and fatalities to Air Force personnel. In recognition of this fact, the Air Force conducted a voluntary training course for drivers of private vehicles, and in June 1957 prescribed a compulsory classroom course of 10 hours to reach 500,000 airmen under 25 years of age. In May 1957, 63.9 percent of all airmen were in this age class, while 17.2 percent were aged 25 to 29. The Air Force also provided remedial training for drivers involved in traffic violations and accidents.

Through safe-driver education, safety awards, and training courses, the Air Force tried to improve the driving habits of its personnel. A new voluntary training program was conducted during January-June 1957, in which 5,000 USAF personnel took 38 hours of classroom training and 8 hours behind the wheel. During this period, the 245 Air Force fatalities caused by private vehicle accidents represented a drop of 11.2 percent from the 276 fatalities that occurred during the same period of 1956. During calendar year 1956, fatalities to Air Force personnel as the result of private vehicle accidents numbered 612, or 73.9 percent of the total of 829 ground accident fatalities.

## VI. Installations

### Programs and Policies

In July and August 1956, Congress authorized more than \$1.3 billion for new Air Force construction in fiscal year 1957 and appropriated \$1.2 billion for this purpose. In accordance with a stipulation of the appropriation act, the Air Force provided \$30 million in the funding plan for reserve force facilities.

For fiscal year 1958, the Air Force appropriation request for military construction was for \$798.8 million in new authorizations. The Air Force actually received \$601.8 million in new authorization from the Congress. The Air Force requested \$1 billion in supplemental appropriations for military construction for 1958, and Congress appropriated \$900 million.

In dividing the construction dollar, the Air Force took into account the needs for seven major kinds of facilities: Those for the combat striking force, for air defense, for missile systems, for research and development, for oversea bases, for reserve force training, and "things for people"—housing, hospitals, recreational centers.

The fiscal year 1958 construction program focused primarily on support of the strategic strike force, new weapons, expansion of the early warning systems, and acceleration of research and development. Outside the United States, new installations were limited to sites for eastward and westward extensions of the DEW line, a research facility, forward aircraft refueling bases, and a tactical missile site.

A major problem was the proper distribution of construction funds between airplane and missile base facilities. The funds allotted for missile facilities increased to 20 percent of the total in the 1958 construction program, as compared with 1 percent in the 1954 program, 8 percent in 1956, and 11 percent in 1957.

After conducting field surveys for new air base sites in Florida, Georgia, Minnesota, New Mexico, and South Dakota, the Air Force decided to build in only one location, the Minneapolis-St. Paul, Minnesota, area. Plans were made for the construction of a new air base near Bethel, Minnesota, with Navy and ANG funds for Navy Reserve and ANG activities. These activities are presently assigned to Wold Chamberlain Airport.

The Air Force dropped all action toward acquiring land for construction of sites for the TALOS interceptor guided missile after Secretary of Defense Wilson ruled in November 1956 that the TALOS should be under the control of the Army.

Plans for dispersal of SAC units required selection of bases that could serve in more than one capacity. Airbase planners adopted the

"multimission" concept to permit interchange of fighter, bomber, and transport units on a base. This flexible approach helped reduce the rate of obsolescence of many bases. Wherever economically feasible, this planning provided for base expansion without relocation or reconstruction of existing facilities. Facilities for new weapons and missiles would be provided by conversion and expansion of existing bases.

The expansion of bases to accommodate SAC dispersal and the extension of runways for Century-type fighter aircraft required construction of new access roads. The fiscal year 1958 construction program included \$5 million for 23 of these access-road projects.

### Construction

Contracts awarded during fiscal year 1957 amounted to more than \$1.2 billion. In June 1957 the Air Force again had a minimum carry-over of unobligated construction funds.

Except for the purchase of a portion of the land for the new Richard I. Bong Air Force Base at Kansasville, Wisconsin, the Air Force took no action for new operational bases. Construction continued at four new ADC interceptor bases—Klamath Falls, Oregon; Glasgow, Montana; Minot, North Dakota; and Grand Forks, North Dakota. Additional facilities for SAC dispersal were being constructed at Minot and Grand Forks. New facilities were also added for B-47 aircraft at five recently activated SAC bases: Abilene, Texas; Homestead, Florida; Portsmouth, New Hampshire; Plattsburgh, New York; and Little Rock, Arkansas.

During the year, 11 of SAC's own bases were expanded for conversion from B-36 to B-52 aircraft. In addition, the Air Force let contracts for expansion of 11 other bases to accommodate SAC B-52 aircraft.

Design criteria and standards for facilities to handle BOMARC, SNARK, and other missile units were under continual review as the emphasis on guided missiles increased. The possibility of nuclear detonations presented further problems in the design of facilities capable of resisting the effects of these blasts.

To provide facilities for ballistic missiles training units, the Air Force began construction at Cooke Air Force Base, California. It also continued building facilities for research and development related to the IRBM-ICBM at Patrick, Edwards, and Holloman Air Force Bases. Facilities for employment suitability tests of the BOMARC missile were started at Eglin Air Force Base, Florida.

Construction of a second radar station (Texas Tower), off Nantucket, Massachusetts, was completed in December 1956 for the North American air defense system. By June 1957 the foundation structure for a third tower had been floated to the site and erection had com-

menced at a location about 80 miles east-southeast of New York City. The Air Force suspended plans for two other towers. Facilities along the DEW line from Cape Lisburne, Alaska, to Cape Dyer, Baffin Island, were completed by the end of the period. For the SAGE system of automatic control of air defense data, construction of technical facilities had been completed at 6 locations, 1 in Michigan and the other 5 in the eastern United States. Additional construction was progressing at seven other locations.

In Alaska, the Air Force acquired land for a number of sites to be included in the White Alice defense communication network. It also acquired land for the Aleutian extension of the DEW line westward from Cape Lisburne. No action was taken on the plan to enlarge Cook Inlet Bombing and Rocketry Range because of a moratorium imposed by the House Committee on Interior and Insular Affairs on the withdrawal of land from the public domain.

Construction of the Air Force Academy's permanent home at Colorado Springs, Colorado, advanced to meet the schedule for occupancy by September 1958. Work under way included a network of roads and bridges, all utility lines, and major buildings. The tempo of contract placements increased toward a peak of \$8 million per month. A Capehart housing project of 1,200 units was authorized for the Academy. By June 1957 a modified design for the chapel was completed and ready for presentation to Congress, which had objected to the original design submitted in 1955.

The Air Force estimated that the Spanish base project was about half finished. One of the 4 bases being built in Spain for SAC—Torrejon Air Base—was almost ready for occupancy, and its completion was expected by the summer of 1958. The estimated cost of the Spanish project rose to approximately \$242 million, an increase of about \$39 million.

The requirement for the Air Force Reserve in the spring of 1957 called for training facilities at 59 flying centers and 107 nonflying centers. By June 30, 1957, the AFR had facilities in use at 39 flying centers and 93 nonflying centers. Of the flying centers, 23 were in joint use with the Navy and/or Air National Guard. The fiscal year 1957 program included construction of facilities at 19 flying centers at a cost of \$40.2 million. Before undertaking new construction for nonflying centers, the Air Force gave consideration to using Government-owned facilities or leasing commercial space. As of June 1957 the Air Force had authorization for construction of facilities at 27 nonflying centers; 3 were completed and 2 more were being built.

The Subcommittee for Special Investigations of the House Committee on Armed Services opened hearings at the end of June 1957 to examine the Air Force's current policy, adopted in 1956, of con-



Figure 11. Super Sabre F-100C in flight.

structing all primary pavements of portland cement. The committee asked the Air Force to test further during fiscal year 1958 the relative merits of portland cement and asphalt as runway construction materials.

By June 30, 1957, the Air Force had a total of 284 active primary installations, in the first six categories of classification:

	Total	Zone of Interior	Overseas
TOTAL.....	284	163	121
Operational.....	177	81	96
Operational Flying Support.....	15	6	9
Operational Nonflying Support.....	14	2	12
Logistical.....	20	16	4
Research and Test.....	8	8	0
Training.....	50	50	0

The increase of five over the total June 1956 inventory was partly the result of reclassification of installations.

### Housing

The building of Air Force family housing units did not progress as planned. Limitations on obligation of funds contributed to a slow-down in contract placements so that the year ended with only 10,811

Title VIII (Capehart) units under construction instead of the 20,000 units planned.

In Great Britain, the Air Force began contract action for 748 Air Force family housing units to be financed under a \$12 million surplus-commodity project. In previous years this method of financing had provided \$15 million for housing units in Great Britain. A change in Air Force deployment made it unnecessary to carry out a similar project in Italy.

In the rental-guarantee program, 2,542 family units in France were accepted for occupancy by June 30, 1957, and a 700-unit project was completed in Morocco. A 1,518-unit project was under construction in Spain.

The entire family housing program included five kinds of funding. Under the regular military construction appropriation program, 57 projects were planned totaling 5,571 units. Of these, 47 projects (3,324 units) were completed or under construction at the end of the year. Under the Capehart program, 103 projects (totaling 48,707 units) were planned, of which 1 project (944 units) was completed and 12 projects (10,811 units) were under construction. The following table shows the number of family housing units completed, the number still in the development phases, and the number under construction at the end of June 1957.

	<i>Existing</i>	<i>Planned</i>	<i>Under construction</i>
Appropriated fund.....	29,547	2,247	2,125
Wherry.....	36,707	0	400
New Title VIII (Capehart).....	944	36,952	10,811
Rental guarantee.....	3,242	263	1,662
Surplus commodity.....	1,222	6,848	2,208
TOTAL.....	71,662	46,310	17,206

### Base Maintenance

The Air Force continued its program to strengthen its installations squadrons by increasing the proportion of military personnel assigned. From May 1956 to March 1957 the percentage of civilians in the squadrons dropped from 70 to 65. It was planned that the goal of 60 percent civilians and 40 percent airmen would be reached by July 1959. The Air Force believed that increasing the number of military positions would help raise the quality of airmen assigned to the squadrons because of the improved career opportunities made available to them.

The Air Force estimated that during the year 60 percent of its worldwide bases put into effect the revised procedures for base maintenance. Tests at Moody Air Force Base, Georgia, completed during fiscal year 1956, furnished the data upon which directives and briefings to the field were based. Representatives from Headquarters USAF followed up with visits to bases whenever assistance was requested.

## VII. Research and Development

The great destructive power of modern weapons makes it likely that the initial phase of a general war will be decisive and of brief duration. The technological race must therefore be won during peacetime. In science and engineering, time spent in development is critical. The Air Force in fiscal year 1957 studied various methods for reducing the time of development. The most difficult problem in managing the research and development effort was recognized as the selection of the most promising ideas for further investigation.

USAF development planners analyzed the potential military usefulness of ballistic missiles, satellites, and other space vehicles needed to meet probable USAF military objectives between 1965 and 1975. An evaluation was made of tactical aircraft and missiles as atomic delivery systems during the decade after 1960. At the request of the Air Force, the Rand Corporation studied the role of electronics in air warfare to help the Air Force attain greater offensive and defensive capabilities after 1960.

Congress appropriated \$710 million for research and development for fiscal year 1957. In addition, the research and development effort received support from funds in other program areas. For example, military construction funds were used to pay for Government test facilities and military personnel appropriations for the salaries of military people at research and development installations. And sums allotted for procurement, production, and maintenance helped buy test items and "hardware" used to complete weapons in the latter stages of development.

### Weapon Developments

#### *Strategic Air Developments*

Acting under the highest national priority, the Western Development Division of ARDC<sup>2</sup> directed this nation's largest peacetime military development program. Included in the program were 17 major contractors located throughout the United States. New development, test, and production facilities valued at nearly \$500 million were completed or programmed. The Division was also responsible for insuring that a trained force will be available to handle the missiles for the Strategic Air Command.

The Air Force continued its intensive effort to complete the development of the ATLAS and TITAN intercontinental ballistic missiles

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<sup>2</sup> As of July 1, 1957, the WDD was renamed the Air Force Ballistic Missile Division.

## DIRECT RESEARCH AND DEVELOPMENT APPROPRIATIONS FOR AIR FORCE ( IN MILLIONS )

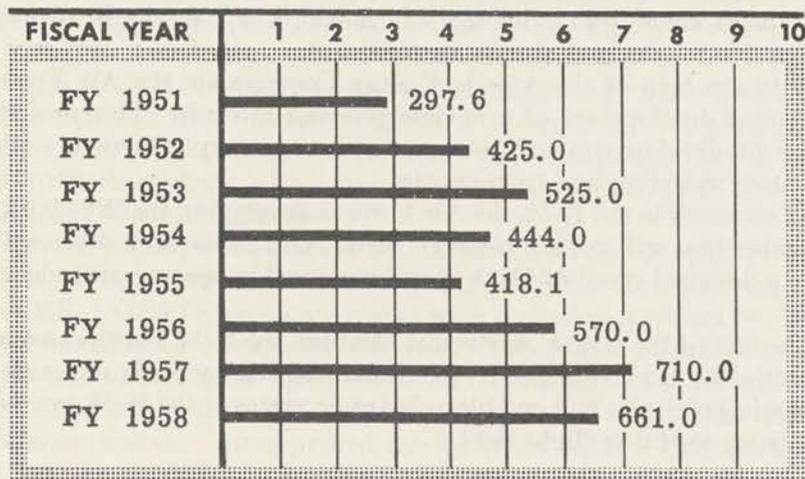


Figure 12.

and the THOR intermediate-range ballistic missile as quickly as possible. Development of test versions of the THOR was accelerated because part of the booster combination developed for the ATLAS could be used as a powerplant for the THOR.

One of the most difficult technical problems in the ballistic missile field was the design of a nose cone that would not burn up as it reentered the earth's atmosphere at an extremely high speed. Test vehicles proved a quick, accurate, and less expensive way to obtain reliable data. A 3-stage reentry test vehicle, the X-17, simulated reentry conditions at extremely high speeds. Flight tests of the HTV, a 1-stage rocket, also revealed important information on reentry at hypersonic speed.

To improve the missile tracking capability of the South Atlantic test range extending southeastward from Cape Canaveral, the Air Force obtained 11 vessels from the Army and the Maritime Administration for use as picket ships.

The air-breathing strategic missile, the SM-62 SNARK, neared the end of its development stage as numerous successful launchings were made at Patrick Air Force Base, Florida. In July 1957 the Air Force canceled the development of a second air-breathing strategic missile, the SM-64 NAVAHO, in order to devote adequate funds to the higher-priority ballistic missiles. But the NAVAHO project was of great value because it supplied important data on rocket engines and ramjets.

Development of the GAM-63 RASCAL neared completion. This air-to-surface supersonic guided missile will be able to penetrate enemy target areas from a distance and make its carrier, the B-47, less vulnerable to enemy defense measures.

With the help of the Atomic Energy Commission, the Air Force continued development of a nuclear-powered aircraft. This project called for development and testing of nuclear powerplants along with radiation shielding and components.

As successor to the B-52, the Air Force is developing the WS-110A, a bomber that will use high-energy fuels. This chemical bomber will have a designed speed of Mach 3, and increased range and altitude as well.

The first of the USAF supersonic bombers, the B-58 Hustler, made its initial flight in November 1956. Incorporating radically new aerodynamic principles and complex electronic systems, the B-58 proved highly successful in flight tests.

#### *Tactical Air Weapons*

At the end of the year two new aircraft, the F-104 Starfighter and the F-105 Thunderchief, were well along in testing and showed significant advances in speed, altitude, and general performance. The F-105B, a supersonic all-weather fighter-bomber, underwent successful flight tests. This single-place aircraft has a "coke-bottle" fuselage. Its J-75 engine, which is in the 15,000-pound thrust class, is the most powerful jet engine in production in this country.

In December 1956, the Air Force terminated development of the RF-104 and the RF-105, and assigned the RF-101A to the Tactical Air Command to meet reconnaissance needs. TAC will also use the single-place F-101A as a fighter-bomber.

The Air Force gave considerable thought to the characteristics of a highly advanced tactical fighter to succeed the F-104 and F-105. Experimentation was conducted with the X-13, flight tested in April 1957, and the X-14 which can take off and land vertically, hence do not need extensive or expensive runways. Operating them in advanced or inaccessible regions would seem feasible if the pattern of experimental testing remains promising.

The development of the XB-68, a supersonic, all-weather tactical bomber, was canceled in January 1957 for lack of funds. TAC planned to use tactical missiles and improved fighter-bombers to furnish improved weapon systems beyond the current B-66. The TM-76 MACE, an improved model of the MATADOR, was developed to meet the need for an all-weather weapon.

#### *Air Defense Weapons*

The F-106A (formerly the F-102B) made its first test flight in December 1956. Equipped with the most advanced fire-control system and armament yet developed for a USAF interceptor, the F-106A will be able to fly in the stratosphere and in any kind of weather, day or night. A tandem, 2-place version was designated the F-106B.

The F-101B Voodoo, an all-weather, long-range interceptor, first flew in March 1957. Powered by two J-57 engines, this 2-place plane can climb very quickly to extremely high altitudes. The 2-place F-104B Starfighter, which first flew in January 1957, will also join the Air Defense Command.

In July 1957, at Operation PLUMBBOB at the Nevada Proving Ground, the Air Force successfully demonstrated the effectiveness of its MB-1 GENIE air-to-air rocket with a nuclear warhead by firing it over the heads of exposed observers. The primary purpose of this test was to determine blast effects and radiation. The information collected will help make nuclear weapons more effective in the air defense mission. An improved version of the GAR-1 FALCON and a new air-to-air guided rocket, the GAR-2, entered the inventory during the year.

The IM-99 BOMARC performance exceeded expectations, and was readied for production. This long-range guided interceptor missile, powered by two ramjets, can reach supersonic speeds to meet and destroy enemy aircraft at great distances from its launching site.

### **Supporting Developments**

#### *Transport and Training Aircraft*

The C-130A tactical transport plane began replacing the C-119 in medium troop carrier units in December 1956. The C-130A is a high-wing, all-metal monoplane powered by four T-56 turboprop engines. The C-130B, with structural changes, extra fuel cells, and a later version of the T-56 engine, was designed for greater range and payload. This improved logistical version was scheduled to follow the C-130A on the production line in December 1958.

In March 1957 the Air Force canceled development of the C-132 because the requirement for the plane no longer existed. The C-133, a heavy long-range transport already slated to replace obsolete transports, will fulfill some of the duties planned for the C-132. An ad-

vanced version of the T-34 engine is expected to improve the performance of the C-133.

Flight tests showed that the T-37 jet trainer had good flying qualities and could be easily maintained. The Air Training Command asked for changes in the plane's original configuration to make it more acceptable for student training. Scheduled production was slowed down to incorporate as many of the changes as possible before delivery.

The new H-43 helicopter will be used to rescue survivors from aircraft crashes occurring within 75 miles of air bases when land vehicles are unable to reach the aircraft. Helicopters will carry rescuers and a fire-fighting kit to the scene of the accident and take survivors to the nearest hospitals. The Air Force also continued development of the T-38, a 2-engine jet plane, to meet the need for a modern basic trainer.

The Air Force completed several flight tests of the Q-4 and Q-5 supersonic drones—air-to-air targets designed to simulate enemy supersonic weapons. A joint Air Force-Navy requirement existed also for an inexpensive, supersonic drone for air-to-air and ground-to-air missile training.

#### *Aeronautics*

In cooperation with the Navy and the National Advisory Committee for Aeronautics, ARDC directed the building of an extremely high-speed research aircraft, the X-15. This successor to the X-2 will be powered by a rocket engine, now under development, which will provide a greater thrust than the engines of earlier experimental aircraft.

#### *Equipment*

ARDC completed development of a radar set designed to permit a weather observer on the ground to see and identify the thickness and height of clouds passing overhead. The Air Weather Service and the Air Proving Ground Command planned joint tests to determine the extent to which this radar set will make weather forecasting more accurate.

In January 1957 the Air Force accepted Volscan, a semiautomatic computer for controlling air traffic. Volscan receives data from radars and gives control instructions that provide for an orderly feeding of aircraft to the final landing approach at 30-second intervals in any kind of weather.

The Air Force made plans to use the M-61, a 20-mm. Gatling gun, as standard equipment for future high-performance aircraft. A 19-round 2.75-inch rocket launcher, originally developed by the Navy, will be used in fighter-bombers of the Century-series aircraft.



Figure 13. The Convair F-106A Delta Dart, all-weather jet interceptor.

### *Human Factors*

In December 1956 an ARDC scientist reached a simulated altitude of 198,770 feet, nearly 38 miles, in an aeromedical altitude chamber at Wright Air Development Center, Dayton, Ohio. This test of a partial-pressure suit for high-altitude flight took place under near-vacuum conditions. The Air Force also tested a new material that met requirements for a full pressure suit, to be used in garments or equipment subject to high temperatures and wind blasts.

Recent biological tests indicated that when certain body compounds are exposed to radiation they break down and liberate free radicals which become toxic when they reach a certain concentration. A new method, 10,000 times more sensitive than previous methods, has been developed for determining their presence and concentration.

### *Research*

The Air Force's research efforts are aimed at major areas where basic knowledge is lacking. For management purposes, the theoretical analyses and the experiments of USAF research are divided into broad fields, including:

1. *Propulsion:* The Air Force has pioneered in free radical chemistry, and free radicals have shown promising possibilities as ultra-energy fuels. Solar energy has also been studied as a source of pro-

pulsion. Another approach, in the initial study phase, envisions the reactions from ions, or electrically charged atoms, as a means for providing a small but steady thrust.

2. *Materials*: An ion-emission microscope has been perfected that can magnify up to five million times, making possible the photography of single atoms. This microscope has been used to study the properties of important alloys and the effects of nuclear radiation on individual atoms of solids. Magnesium oxide crystals have been produced that are ductile at room temperature and have a melting point of 5,000° F., opening the possibility of a whole new class of engineering materials.

3. *Electronics*: A joint Service project is being conducted for amplifying extremely weak radio signals. A new device has been developed that may result in essentially new long-distance communication systems. During the year, research continued to extend the range of tropospheric scatter and to increase the intelligibility of reception. Work on a new technique for amplifying light bore fruit during the year. This development may prove of great value in detecting and tracking satellites and other extremely faint objects at extreme altitudes.

4. *Geophysics*: USAF scientists believed that thousands of fragile, harmless balloons, circling the earth for 30 to 60 days, could sample the earth's atmosphere and gather vast quantities of information for electronic computing machines to use in predicting the weather. Since this would require international cooperation, the idea was coordinated with various governmental agencies and presented to the World Meteorological Congress in Paris in June 1957. That body approved the proposal in principle and encouraged international research cooperation in this field.

## VIII. Procurement and Production of Materiel

### Industrial Planning

In May 1957, the Air Force brought up to date its industrial mobilization policy to consider three possible emergency conditions: a general nuclear war, local wars, or cold war. This policy, inaugurated in November 1955, is a departure from the previous practice of mobilizing industrial strength after the beginning of hostilities. Current industrial preparedness takes more fully into account the facilities to be used in each of these emergency conditions, possible industrial damage or dispersal that may be necessary, and the integration of readiness measures and procurement.

Under AMC guidance, manufacturers prepared to deliver critical weapons quickly if all-out war came or to speed up production in the event of local war. The Air Force estimated that normally scheduled deliveries of key SAC and ADC aircraft could be tripled during the first few weeks of a general war and that over half of these planes could move to operational units from factories within hours. After this initial effort, deliveries would necessarily drop drastically.

As part of this industrial-readiness policy, the Air Force bought production equipment for current use rather than for storage and future use. Gradually the inactive standby reserve was reduced in order to keep only those items needed for future development or production programs.

As of June 30, 1957, there were 148,163 items of production equipment in the USAF industrial inventory, valued at \$1.4 billion. Of these items, 115,323 were in active use and 32,840 were idle, in storage, or awaiting disposal. All 10 USAF heavy presses were producing the large forgings and extrusions needed for modern aircraft manufacture.

The Air Force directed almost \$338.5 million of its fiscal year 1957 funds for the expansion of industrial facilities. This sum was larger than anticipated, primarily because of the greater emphasis on special fuel, aircraft nuclear propulsion, and ballistic missiles. In May 1957 the Secretary of Defense limited the authorization of fiscal year 1958 funds for facilities expansion to exceptional cases and temporarily froze the obligation of funds provided by Congress in previous years.

The Air Force insisted that contractors assume a greater share of the costs of facilities expansion. The number of applications for tax amortization considered by the Air Force rose to 258 during fiscal year 1957, or 62 more than the previous year. The Air Force supported

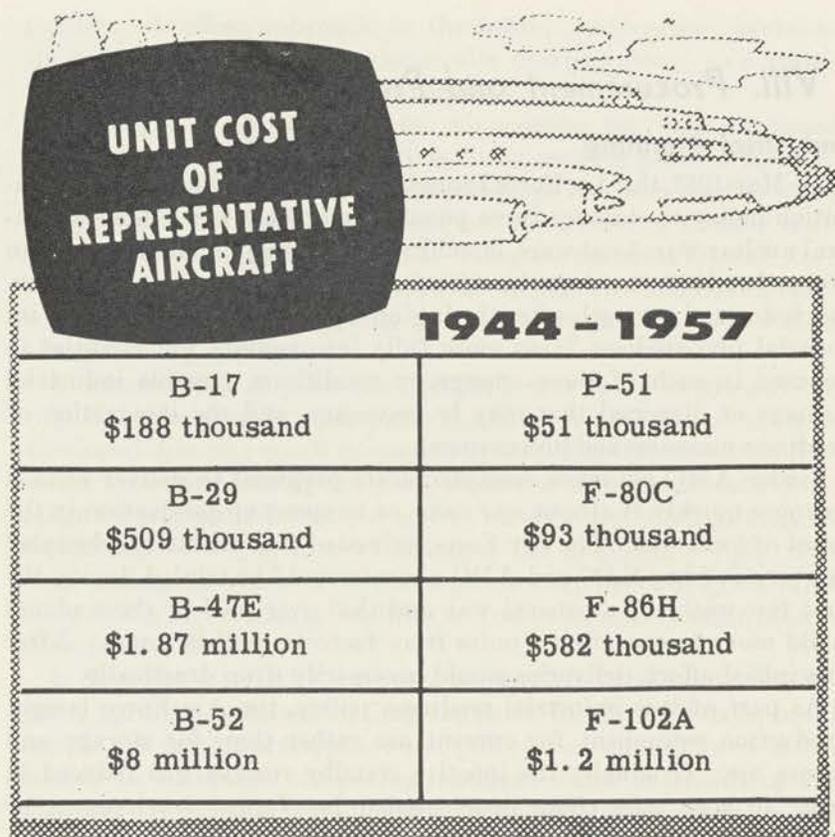


Figure 14.

applications with a gross dollar value of \$264 million as compared with \$178.2 million 1 year earlier.

### Procurement Policies

The Air Force stressed the use of formal advertising in procurement whenever practicable. It is following, on a test basis, a suggestion made by the House Committee on Armed Services which is intended to increase the proportion of advertising in appropriate fields of procurement.

In July 1957 the Air Force completed a comprehensive study of profits in the aircraft engine industry for the period from 1942 to 1956. This study was similar to an earlier one of profits in the air-frame industry. Although a comparison of profits for the two industries could not be conclusive because of differences in facilities investments and commercial sales, the studies indicated that overall profits in both were reasonable.

The Air Force continued to emphasize the importance of giving small business concerns a fair opportunity to compete for contracts. In November 1956 the major commands in the United States were asked to follow the AMC and ARDC example of assigning a small business executive at each headquarters and a small business specialist wherever local purchasing took place.

The volume of USAF business in the continental United States during fiscal year 1957 totaled about \$8.8 billion. Small business concerns received \$723 million in prime contracts out of the \$1.1 billion considered within their capabilities. Except for fiscal year 1951, this amount was the highest figure yet awarded small business.

Since most major USAF contracts of necessity had to be placed with large industrial contractors, the greatest opportunities for small businessmen lay in subcontracting. In 1957, 82 prime contractors who participated in USAF mobilization planning reported that during fiscal year 1957 they had received \$8.26 billion in total receipts from the Air Force, of which \$1.79 billion, or 21.6 percent, went to small business subcontractors. In 1953 small business concerns had received only 15 percent in subcontracts.

### **Aircraft and Missile Production**

During fiscal year 1957 the Air Force recouped a net of about \$1.3 billion by adjustments in procurement requirements and prices of materiel. This amount was applied to the purchase of modern aircraft, missiles, and equipment. Headquarters USAF directed about \$8.2 billion for new procurement, with about 69 percent going for new aircraft and spares, 20 percent for missiles, and the remaining 11 percent for modifications, facilities, and components.

As the Air Force gradually increased missile production, the delivery of aircraft for the inventory declined. During fiscal year 1957, the number of aircraft delivered was 22 percent less than in the previous year. Aircraft acceptances for fiscal year 1957 reached 98.1 percent of the final schedule for the period.

While the total number of B-52's scheduled for production did not change, the Air Force leveled off Stratofortress production in April 1957 at the current rate of 15 per month instead of raising it to a peak of 20 as originally planned. KC-135 tanker production was also adjusted to a 15-per-month rate to conform to the new B-52 program. The Air Force will be able to reorder additional B-52's in a more advanced version if it decides at some future date to increase the number of Stratofortress wings. In June 1957 the assembly of the advanced B-52G was centered at 1 rather than 2 plants, which was expected to save about \$100 million. Design difficulties in the inflight refueling system and the landing gear delayed B-52 deliveries during the year.

## VOLUME OF AF BUSINESS IN THE UNITED STATES

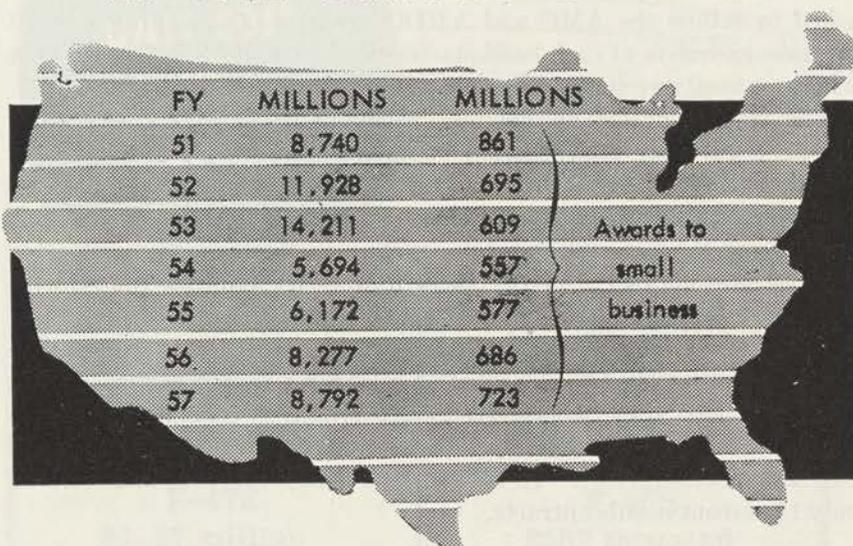


Figure 15.

In February 1957 Boeing delivered the last of 2,041 B-47's to the Air Force. Also, the Glenn L. Martin Company produced its last B-57 or Canberra. In all, the Air Force purchased 383 B-57's and RB-57's. By June 1957, Douglas was about to conclude deliveries of B-66's and RB-66's.

The Air Force accelerated production of the F-102A and TF-102A during the year. Numerous changes in design and in the fire-control and armament system added to the normal difficulties of the Air Defense Command in converting to this new plane. The Air Force took steps to correct these problems, with highly successful results. The F-106A, an advanced version of the F-102, also entered into production during the year.

Other Century fighters on production lines needed more engineering changes than anticipated, and F-101, F-104, and F-105 schedules were adjusted to minimize the cost of the changes. In January 1957 the Air Force decided to obtain additional RF-101 aircraft and at the same time to delete the RF-104 and RF-105 from the USAF program. F-105 production was stretched an additional year to reduce expenditures and obtain a more advanced version of this plane. The F-100 continued in full production during the year.

The Air Force ended production of the KC-97 and RC-121D in 1956. Deliveries of C-123B's and C-130's and C-131's proceeded according to schedule. C-133A schedules were adjusted to incorporate

necessary improvements on the production line. Because of delays in the production of the J-69 engine for the T-37 jet trainer, the Air Force accepted airframes on schedule and put them in storage while awaiting engine deliveries.

In the field of missile production, the Air Force signed a production contract with Northrop in September 1956 for its first operational SM-62 SNARKs. Boeing received a contract in May 1957 to begin manufacturing the IM-99 BOMARC. The Martin TM-61C MATA-DOR continued to roll off the production line.

In December 1956, production of the GAR-1 FALCON, used in the F-89 and F-102, was suspended. Tests showed this air-to-air missile did not possess sufficient accuracy. By March 1957, improvements were made in the fire-control system and other parts of the missile, and the Air Force again accepted production FALCONS.

Aircraft engine production during the year was about 78 percent of the previous year's output and 98 percent of the number scheduled. Ten different engine models having thrusts of over 10,000 pounds passed qualification tests.

The Air Force began to receive important communication and electronic equipment ordered in 1954-55, including ground-controlled intercept computers, gap-filler and search radars, and several types of airborne equipment. AMC received \$719.8 million for the purchase of communication and electronic equipment.

### **Mutual Assistance Program**

The North Atlantic Treaty Organization nations have received the bulk of United States military assistance since the Mutual Assistance Program was begun in 1949. At the beginning, most of the aircraft shipped were reciprocating-engine types available from excess or current USAF stocks. More recently, they have received jet aircraft and other modern equipment, and the Air Force is planning to send these countries Century-series aircraft and guided missiles.

Within recent years, nations in the Southeast Asia Treaty Organization, as well as those having mutual security agreements with the United States, have been receiving military assistance. The Air Force will also send jet aircraft under grant aid to help certain Latin American countries improve and modernize their air forces.

During the 8 years of USAF assistance to friendly air forces, the Air Force has set aside \$6.9 billion for the Mutual Assistance Program. The monetary value of the materiel shipped and the services rendered reached \$5.2 billion, or about 76 percent of the program. NATO nations received \$3.4 billion, or about 66 percent of the \$5.2 billion.

Most military aid has taken the form of grant aid and of mutual security military sales. In fiscal year 1957, 37 countries eligible for

grant aid received military equipment, training benefits, and technical help. During this period, 48 of the 62 nations entitled to do so bought equipment and services for their air forces through mutual security military sales, while their airmen trained at USAF bases.

Over a period of 8 years about 74 percent of the grant aid funds for MAP materiel went for 13,030 aircraft plus spare parts and aeronautical equipment. Of this total, 10,332 planes, or 79 percent, were shipped to the recipient nations, and the remainder were in production or in transit.

Grant aid provided equipment or support for 231 foreign squadrons, including 143 in the NATO countries. Of this number 173 were equipped with jet planes, an increase of 38 within the year. Aircraft supported by MAP flew 1,324,000 hours during fiscal year 1957, with jets accounting for 56 percent of the flying time. F-84's accounted for slightly more than half of all hours flown in jets.

The Air Force also trained members of foreign air forces in this country and abroad to insure effective use of equipment supplied by the United States and to help the recipient nations to eventually set up their own training programs. Since 1950, USAF schools have given pilot training to 3,300, other forms of flying training to 4,500, and technical training to almost 30,000 men from these countries.

## ***IX. Logistical Services***

Efficient management of USAF materiel is an urgent necessity, since the air arm has to be kept in a state of constant readiness despite the rising costs of national defense. The Air Force shortened the time it takes to deliver weapons to combat units and cut down the number of expensive items ordered. USAF planners worked with the Rand Corporation to analyze fundamental logistical problems, and tested and applied ideas on initial supply, the pattern of demand for aircraft spare parts, and the use of electronic data-processing equipment.

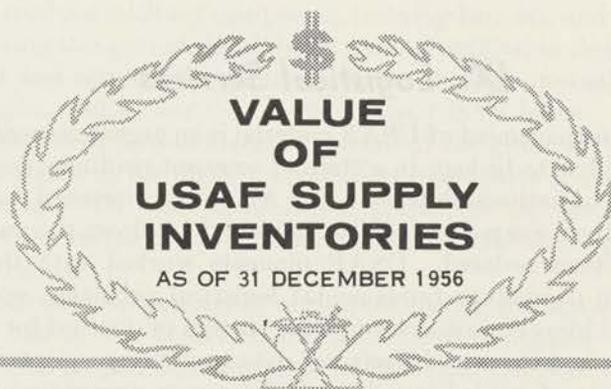
The advent of guided missiles called for new procedures. Supervised by the appropriate air materiel area, contractors are now required to provide logistical support during the research and development stage. As the weapon system enters into production, the Air Force gradually assumes this responsibility. The transition is orderly, since the Air Force only begins to provide logistical support when it is ready to do so.

AMC control of USAF depots throughout the world has resulted in many improvements. By shipping materiel directly from contractors to oversea depots, AMC reduced pipeline time, inventories, handling, and reshipment. By distributing items among all its depots, AMC insured a better utilization of USAF resources. On January 1, 1957, AMC set up Central Air Materiel Area Europe to support USAF forces and the Mutual Assistance Program in Europe.

### **Supply and Services**

In December 1955 the armed Services agreed to exchange items in common use, and by June 1957, 19 commodity coordination groups (7 headed by USAF representatives) had been set up for this purpose. During fiscal year 1957, these groups transferred more than \$65.2 million's worth of supplies that the Services otherwise would have had to purchase. In June 1957 a group was set up to handle aircraft engine accessories, an item of particular significance to the Air Force. USAF organizations in this country were not authorized to buy inter-serviceable items locally if the total quantity cost more than \$2,500 and if they could be obtained from AMC depots or from the other Services.

The problem of handling the vast quantities of data associated with the USAF logistical system assumed major proportions. One solution was electronic equipment that transmitted information on inventories and workloads immediately and decreased the number of documents needed to manage the supply system. These electronic systems at USAF depots helped keep track of war reserve stocks of



**VALUE  
OF  
USAF SUPPLY  
INVENTORIES**  
AS OF 31 DECEMBER 1956

	1956		1955	
	DOLLARS	%	DOLLARS	%
Engine and Engine Spare Parts	3,819,899,000	26.8	3,072,986,000	22.8
Aircraft Instruments, Assemblies & Compon- ents	2,627,582,000	18.3	2,571,778,000	19.1
Airframe Spares	1,452,457,000	10.2	1,323,150,000	9.8
Armament & Photogra- phic Equipment and Supplies	1,176,090,000	8.1	920,243,000	6.8
Electronics & Comm- unications Equipment, Spares & Supplies	892,724,000	6.3	1,000,296,000	7.4
Intransit Stocks	811,420,000	5.8	746,010,000	5.5
Stock Fund	800,331,000	5.7	603,676,000	4.5
Vehicles & Spare Parts, Marine Equipment, and Construction Machinery	545,891,000	3.8	430,351,000	3.3
Misc. Hardware & Gen- eral Purpose Supplies	392,614,000	2.7	550,315,000	4.0
Ammunition	372,287,000	2.6	94,986,000	.8
All Other	1,386,690,000	9.7	2,143,960,000	16.0
<b>Total</b>	<b>14,277,985,000</b>	<b>100</b>	<b>13,457,751,000</b>	<b>100</b>

Figure 16.

aircraft spare parts, compute requirements for these parts, and control the inventory of engines.

In the past the Air Force normally spent a large percentage of aircraft funds for spares before new planes were delivered. It became increasingly difficult, however, to predict accurately the proper ratio of spares in advance of actual experience with the aircraft. The Air Force decided, therefore, to postpone large commitments of funds for spares and to buy only a minimum number until more could be learned about the operation and support of these aircraft. In June 1957 the new policy was applied to the purchase of a limited number of items of high value used in the F-106B.

In 1957, the Air Force spares pricing policy was recast to save money in purchasing and in cost of handling. Research showed that approximately half of the money spent for spare parts went for about 12,000 items representing less than 3 percent of the USAF inventory. These high cost items were not getting the proportion of attention warranted by the Air Force investment in them. To this end, the practice of reviewing the prices of all items annually was supplanted by one which permitted high value items to be reexamined every 3 months, and 600,000 items costing under \$10, every 2 years. In addition, the Air Force permitted bases to transfer a 30-day supply of items costing less than \$10 each from their warehouses to their retail stores where accounts were kept in terms of dollars only rather than by items, as before.

The local purchase of certain items continued to prove an economical means of reducing inventories, warehouse space, and personnel. The number of line items authorized for local purchase reached 160,000 of which 7 percent was supplied by General Services Administration. The volume of USAF business with GSA during fiscal year 1957 amounted to \$50.9 million.

The Air Force reclaimed spare parts and components from the B-36's and RB-36's being released from the USAF inventory. The net value of the parts salvaged from the first 95 aircraft, minus the cost of getting these parts back into the supply system in serviceable condition, was about \$43.6 million. The unusable components that remained were sold for \$831,345.

After the Secretary of the Army became the single manager for clothing and textile materiel, USAF and Army representatives reached agreements concerning the transfer of functions and personnel to the new Military Clothing and Textile Agency. On March 1, 1957, the Air Force transferred responsibility for wholesale management of uniform clothing and related items to the new agency. The Air Force kept the retail management of these goods and furnished periodic

statements of clothing needs. Each USAF installation bought these items when necessary, and a USAF fund was used to reimburse the new agency for these purchases.

### **Maintenance**

In line with its industrial-readiness policy, the Air Force adopted a program to accelerate maintenance work to meet emergency demands. Both USAF and contract maintenance will provide a production base to put the largest number of aircraft and equipment into operation within the shortest span of time after D-day.

The total cost of maintenance and modification reached more than \$1.3 billion during fiscal year 1957. As weapon systems became more complex and the costs of labor and materiel rose, aircraft modernization costs increased steadily. The Air Force had to decide whether to make changes in older equipment or curtail these changes and buy new items. Modernization costs for fiscal year 1957 were reduced from an originally anticipated \$1 billion to \$700 million.

By careful analysis of reports on the condition of its aircraft, the Air Force was able to lengthen the intervals between the periods when these aircraft were inspected and repaired. During fiscal year 1957 these intervals for the C-45, C-131B, and T-29 were extended 12 months, lowering maintenance costs and workloads.

Maintenance problems stemmed primarily from the inability of the Air Force to retain experienced airman technicians and from the difficulty of repairing highly complex weapons. The Air Force used manufacturers to do much of its maintenance work. During fiscal year 1957, it contracted for almost \$350 million of its depot maintenance work and spent \$61.4 million to hire contractor technicians for assistance at airbases.

The best way to meet the maintenance challenge was to make new items more reliable and to improve designs so that weapons could be repaired more easily. Engineers working on new engine designs visited USAF airbases to study actual working conditions, including personnel on hand, shop layouts, facilities, and parts.

The Air Force continued to improve its field and organizational maintenance systems, using the established principles and procedures of industrial management. The information obtained from the pilot project at Dover Air Force Base, Delaware, will help develop a management system for all USAF maintenance.

The noise of jet aircraft remained a serious nuisance to nearby communities. The Air Force evaluated designs for silencers to determine which would be most effective in cutting down this noise, and successfully tested a prefabricated steel silencer.



*Figure 17. The C-130 Hercules, turboprop transport.*

### **Transportation**

In the spring of 1957, the Air Force and the Canadian Department of Transport reached an agreement for Canadian commercial transportation systems to resupply annually certain DEW line sites in that country. Canada will deliver fuels and cargo to these sites, relieving the United States of difficult and expensive joint task force operations in that region each year. Operations under these agreements will begin during the 1958 shipping season, with the United States bearing the costs at agreed rates. River barges, ocean-going ships, C-46 and C-54 aircraft, and helicopters will be used.

The number of airbases that received petroleum products by commercial pipelines rose from 10 to 13 during the fiscal year. Pipelines owned by the military, although operated by commercial concerns, also served five additional bases.

By June of 1957, about half the Air Force personnel being assigned overseas were having their household goods moved under a new system called Motor Van-Sea Pac. Faster, safer, and more economical, goods under this system were shipped uncrated in containers in individual vans, instead of being packed and crated conventionally. In each case, one moving company was held responsible for these goods from pickup in the United States to delivery to the serviceman's home overseas. The goods moved on a single government bill of lading.

## X. Management

### Comptroller Service to Management

Faced with rising costs and such unforeseen requirements as emergency airlifts and disaster relief, the Air Force found its appropriations insufficient to support the existing programs. In addition to providing direct financial services, the Comptroller organization played an important part in assisting management to obtain maximum value from the limited supply of dollars.

#### *Accounting and Finance*

In July 1956, Headquarters USAF consolidated two of the Comptroller directorates into a single Directorate of Accounting and Finance, with responsibility for the establishment of overall policies, systems, and procedures in the fields of accounting, disbursing, and financial reporting. The reorganization was expected to eliminate duplication of records and staff work and to bring about more effective compliance with certain new Federal regulations. The Air Force Finance Center at Denver, Colorado, took charge of centralized accounting and finance operations. Integration of the accounting and finance functions was also being extended to the comptroller organizations in the major commands.

#### *Auditing*

The impact of the accelerated missile program and the loss of highly qualified auditors to industry imposed a severe strain on effective performance of contract audit functions during the year. In some cases audits were postponed where this would not result in undue delay in payments to contractors.

To assist Air Force management in conserving funds, contract auditors carried out several special surveys, including a nationwide study of contractors' expenditures for advertising and for the recruitment of engineering and technical personnel, a study of contractors' costs for packaging Air Force supplies, and a study of cost accounting in the plants of jet engine contractors to assist the Air Materiel Command in comparative evaluations of engine price proposals. Another significant accomplishment of the contract auditors was the assistance rendered procurement officials in evaluating contractors' forecasted costs included in proposals for new procurement. As a result, substantial sums which would have been unnecessarily obligated for performance on these particular contracts remained available for other procurements.

In addition to their continued program of management assistance to commanders, USAF internal auditors, located at Air Force installations throughout the world, performed a number of special surveys. A notable example was a worldwide survey of the Hi-Valu Item Control Program to determine the effectiveness of the base-level control and reporting procedures and to recommend necessary improvements. Auditors performed an examination at all USAF accounting stations around the world, covering administrative, central procurement, and working capital funds. The object was to advise commanders of actions required to assure effective compliance with certain new Federal regulations.

#### *Working Capital Funds*

Operations financed by USAF working capital funds were materially affected by additional single manager assignments made by the Secretary of Defense.

During the last 6 months of fiscal year 1957, the Secretary of Defense designated the Secretary of the Army as the single manager for clothing and the Secretary of the Navy as the single manager for medical materiel. These assignments affected the inventories, cash, and procurement requirements of the Air Force, since all its depot stocks were taken over and capitalized by the single manager.

On December 7, 1956, the Secretary of Defense designated the Secretary of the Air Force as the single manager for airlift service. Beginning January 1, 1958, users of the common airlift service will pay into a revolving fund the cost of the services they receive.

#### *Reporting and Analysis*

The Air Force made increased use of analyses based upon the weapon system concept, including a series of weapon system summaries that covered the characteristics of a particular weapon system; the program for development, testing, and operational employment; the problems that demanded the attention of management; and the money needed to attain and operate the weapon system as well as the investment made to date.

The Air Force improved its techniques and procedures for estimating the costs of long-range programs. It became possible to produce a broad estimate for a complete force structure for a 10-year period in less than 5 working days. Such rapid production resulted in more extensive use of this data to evaluate the financial implications of a proposed plan and to assess the cost of alternative courses of action.

At the end of June 1957 there were 43 medium and 14 large electronic data-processing systems in operation—a sharp increase over the previous year. Basically, each system consisted of a computer, associated equipment, and techniques for feeding data into the computer

and extracting mathematical results. Although particularly applicable to materiel management and research and development needs, electronic systems were also applied to a wide variety of other fields. These systems can solve extremely complex problems in a short time with minimum use of highly trained people.

The use of large-scale computers to shorten the programing cycle was a major accomplishment in electronic data-processing. AMC used magnetic tape to transmit information on the projected aircraft inventory program to Headquarters USAF, where machines prepared the basic document. This change brought sizable savings in time and personnel, in addition to providing data automatically for the preparation of the flying-hour program and documents on related subjects.

The Air Force recognized the need for further mechanization in collecting, transmitting, and processing statistical data. At the end of the year the transceiver network was carrying more than 5,000,000 punch cards per month. Faster methods of transmission were still being sought. By June 30, 1957, a total of 260 installations, including 140 bases, had been equipped with mechanical statistical equipment. During the past year the number of machines in use increased from 5,845 to 8,630.

### **Manpower Management**

During the fiscal year the military strength of the Air Force rose from 909,958 to 919,835, as the goal of 137 wings established nearly 4 years ago was finally attained. However, a far greater proportion of USAF manpower was in the operating forces than had been envisioned when the 137-wing target was established. By diverting military personnel from the supporting and training forces, the Air Force added 48,000 to its operating forces, although the total military strength increase was less than 10,000. The percentage of military personnel in the operating forces increased from 60 percent to 65 percent. Considered from another standpoint, better utilization of military manpower resulted in an increase of the operating forces by 8.7 percent, while the supporting forces decreased by 5.5 percent and the training forces by 16.8 percent.

In 1957 the previous goal of 936,000 military and 433,404 civilians was reduced to 920,700 military and 427,404 civilians. After reexamining its manpower program the Air Force deleted 37,632 authorizations for both military and civilian positions from selected areas throughout the Air Force and then switched them to meet new requirements added to the program during the year. Of the authorizations deleted, 7,493 were from headquarters functions, 13,965 were from base and mission support functions, and 14,868 were from equipment maintenance functions.

In this major effort to align manpower utilization with the strength authorizations established by the Department of Defense, the Air Force reorganized or eliminated entirely a large number of units. The Northeast Air Command was disestablished with a saving of 3,000 spaces. The Air Rescue Service was reduced with an ultimate saving of 1,945 spaces. Sampson Air Force Base was eliminated and functions at Parks and Ellington Air Force Bases were reduced with a total saving of 5,500 spaces.

### **Administrative Services**

In the management of records, the Air Adjutant General assumed responsibility from the Army for the storage, servicing, and distribution of all noncurrent Air Force records. After reevaluation, more than two-thirds of the USAF records at the Kansas City Records Center were destroyed or earmarked for destruction within 6 years, and the remainder were consolidated with the holdings at the new Air Force Records Center which opened in St. Louis, Missouri, in July 1956. Substantial savings in space and personnel resulted from this consolidation plus increased efficiency in servicing noncurrent records.

The Post Office Department permitted the Air Force to discontinue prepayment of postage on official mailings and substitute annual lump-sum payments. This new postal procedure will speed up the mail handled at Air Force post offices. Consolidated mail rooms at 66 airbases featured individual lock boxes that permitted round-the-clock pickup of personal mail instead of the former "mail-call."

In December 1956, Headquarters USAF directed that all printing equipment be purchased locally, rather than through central procurement. This change, to become effective in July 1958, was made in order to cut down on transportation costs and paperwork and to reduce the time required to obtain equipment. The Congressional Joint Committee on Printing approved the installation of mechanical collating equipment at Air Force depots—a change expected to save 52,000 man-hours annually. The committee also authorized the purchase from aircraft and equipment manufacturers of technical literature on out-of-production items as well as in-production items. This procedure furnishes instructions simultaneously with the arrival of aircraft and equipment.

### **Inspector General Activities**

The activities of the Inspector General, while embracing all areas of Air Force interest, centered particularly on uncovering deficiencies affecting the offensive and defensive capability of the Air Force. Inspectors directed special attention to the combat readiness of units;

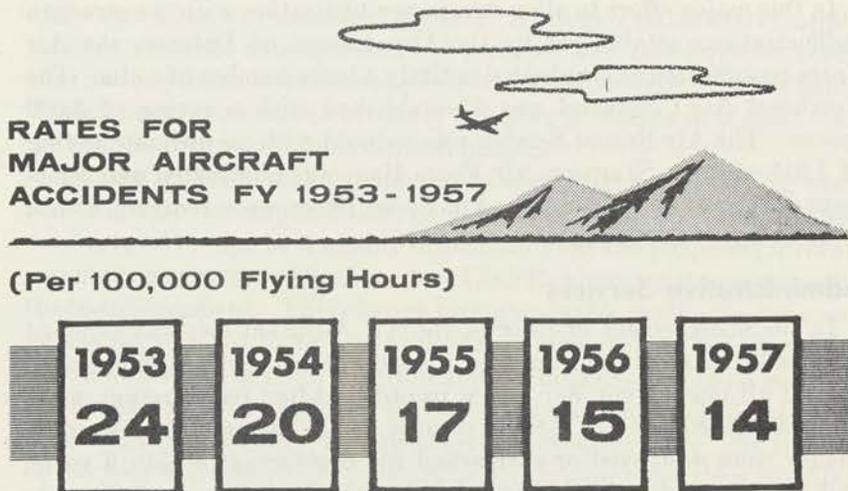


Figure 18.

the health, welfare, morale, training, and direction of personnel; the flying safety program; the security of documents, personnel, and installations; the worldwide procurement programs; the development, production, and employment of new weapon systems; and the effectiveness of the command inspection systems.

#### *Readiness and Materiel Inspections*

Readiness and materiel inspections and surveys dealt with major USAF programs in operations, logistics, and personnel, pinpointing areas where greater efficiency could be attained. One of the major efforts, a survey of USAF capability to support the war plans of the Strategic Air Command, revealed several deficiencies retarding the full realization of USAF striking power.

The Inspector General maintained continuous surveillance of the command inspection system through evaluation of the manner in which the major commands conducted operational readiness tests. This procedure made it possible to save time by limiting formal surveys to commands with known deficiencies and permitted inspectors to devote their attention to other pressing problems.

#### *Flight Safety*

An aggressive flight safety program is vital to the Air Force, not only because of the tremendous cost of aircraft accidents in life and property but also because of the need of conserving combat capability for wartime use. The crash of a B-52 represents a monetary loss of about \$8 million; of a C-124, about \$1.7 million.

In addition to stressing safety factors in the design and production of aircraft, the Air Force continued its vigorous effort to educate

flying and maintenance personnel in the basic principles of safe flying. Safety surveys conducted by highly qualified personnel helped commanders to uncover accident-producing hazards. Official publications, conferences, and presentations also brought home to all USAF personnel additional means of accident prevention.

Attesting to the effectiveness of the USAF accident-prevention program, the rate of major aircraft accidents declined to a record low of 14 per 100,000 flying hours during the first 6 months of 1957. The rate of fatal accidents also declined, although fatalities per major accident increased as compared with the similar period in 1956.

#### *Provost Marshal*

The Provost Marshal conducted a survey of Air Force installations and state conservation agencies to determine if hunting and fishing practices permitted on the installations were in accord with existing state and Federal laws, and the results were most gratifying. In the course of the survey sufficient information was accumulated to provide the basis for a Department of Defense position on fishing and hunting practices on military installations. The Fish and Wildlife Service of the Department of Interior pledged cooperation in developing fish and wildlife conservation programs at Air Force installations. The Provost Marshal disseminated instructions on this program to all major commanders, and a formal regulation is now being prepared.

#### *USAF Security*

During fiscal year 1957 personnel security investigations continued at a high level, totaling 346,000. The impressive volume reflected the scale of activity in developmental work and in operations where highly classified new weapon systems are coming into ever wider use. Air Force investigations concerned not only personnel security but also major crimes and violations of public trust, as well as serious administrative irregularities. The procurement and disposition of USAF materiel came under close scrutiny in all cases involving suspicion of bribery or fraud, and corrective action was taken when necessary.

The Air Force investigative service also tested the security of all major installations, both to locate unrecognized points of weakness and to develop greater security consciousness. The investigative service expanded its activities in counterintelligence and provided an increased flow of information for the use of commanders in identifying and eliminating subversive elements.

## *XI. Budget*

Although the Air Force received \$2 billion more in appropriations for fiscal year 1957 than for 1956, it was necessary to operate with ever increasing austerity and to cut many functions to a bare minimum. Several factors accounted for this situation, which squeezed the Nation's air arm between rising costs and the increasing urgency of its missions. While expanding toward its 137-wing goal, the Air Force had to reequip many units with more modern, more complex, and far more costly weapons. Simultaneously, the Air Force had to support a research and development effort of vast scope to insure that it would be at least equal in quality to any force controlled by potential enemies of the United States.

### **The 1957 Budget**

The Air Force budget estimate for fiscal year 1957, approved by the President and presented to the Congress, amounted to nearly \$15.7 billion in new obligational authority. This estimate, which did not include new military construction, was predicated on the attainment during the year of the 137-wing goal. Actually the military appropriation bill, approved by the President on July 2, 1956, provided new funds of somewhat more than \$16.4 billion, or \$765 million over the original request. The Congress had increased the amount by \$800 million for the procurement of additional heavy bombers and fighters and by \$100 million for accelerating the research and development program, but cuts in other programs reduced the net increase to \$765 million. The additional appropriation for new military construction obligations for the Air Force amounted to more than \$1.2 billion, raising the total of new USAF funds to almost \$17.7 billion. Since an unobligated balance of \$5.7 billion existed at the beginning of fiscal year 1957 and reimbursements of about \$600 million were anticipated, the Air Force had just over \$24 billion available for obligation.

The initial financial plan of the Air Force provided for obligating \$18.7 billion and spending \$17.3 billion during fiscal year 1957. This did not, however, include the \$900 million added by Congress for planes and research and development. The first formal revision of the financial plan reduced obligations and expenditures to \$17.7 billion and \$16.9 billion respectively. In February 1957 the Department of Defense established the USAF expenditure ceiling at \$17.2 billion.

Actually, it was not feasible to hold expenditures within the reduced figures. In April 1957 the Air Force advised the Department of

  
**How The USAF DOLLAR WAS SPENT Fiscal Year 1957**

Aircraft and Related Equipment _____	40¢
Operation and Maintenance (Less Civilian Personnel) _____	13¢
Civilian Personnel _____	9¢
Military Personnel (Pay, Allowances, Travel) _____	20¢
Military Construction _____	6¢
Procurement Other Than Aircraft _____	5¢
Research and Development _____	4¢
Miscellaneous _____	3¢
	\$1.00

**Total Expenditures • \$18.4 BILLIONS**

*Figure 19.*

Defense that Air Force expenditures would be about \$18.25 billion, and at the end of the year net expenditures actually amounted to nearly \$18.4 billion. New obligations totaled almost \$18.6 billion or about \$100 million less than estimated in the first financial plan.

The rather abrupt and substantial increase in expenditure rates resulted from a number of factors, including the reduction of administrative lead time in the major procurement areas; the increase in applications for progress payments by contractors caused by a generally tight money situation; the acceleration of the ballistic missile programs, which were financed on an incremental basis; and the high rates of production in certain aircraft and guided missile programs. The historical data on which the statistical forecasting method was based did not reflect these changing conditions.

A particular problem was created in the operation and maintenance category by the necessity of providing funds for carrying out the Dependents' Medical Care Act, which became effective after the approval of the appropriation for fiscal year 1957. The President's budget for fiscal year 1958 originally included provision for a supplemental appropriation request for the 1957 operation and maintenance fund to cover the additional costs of dependent medical care. In expectation of this supplemental appropriation, the Air Force apportioned funds for such care. But in March 1957 the Bureau of the

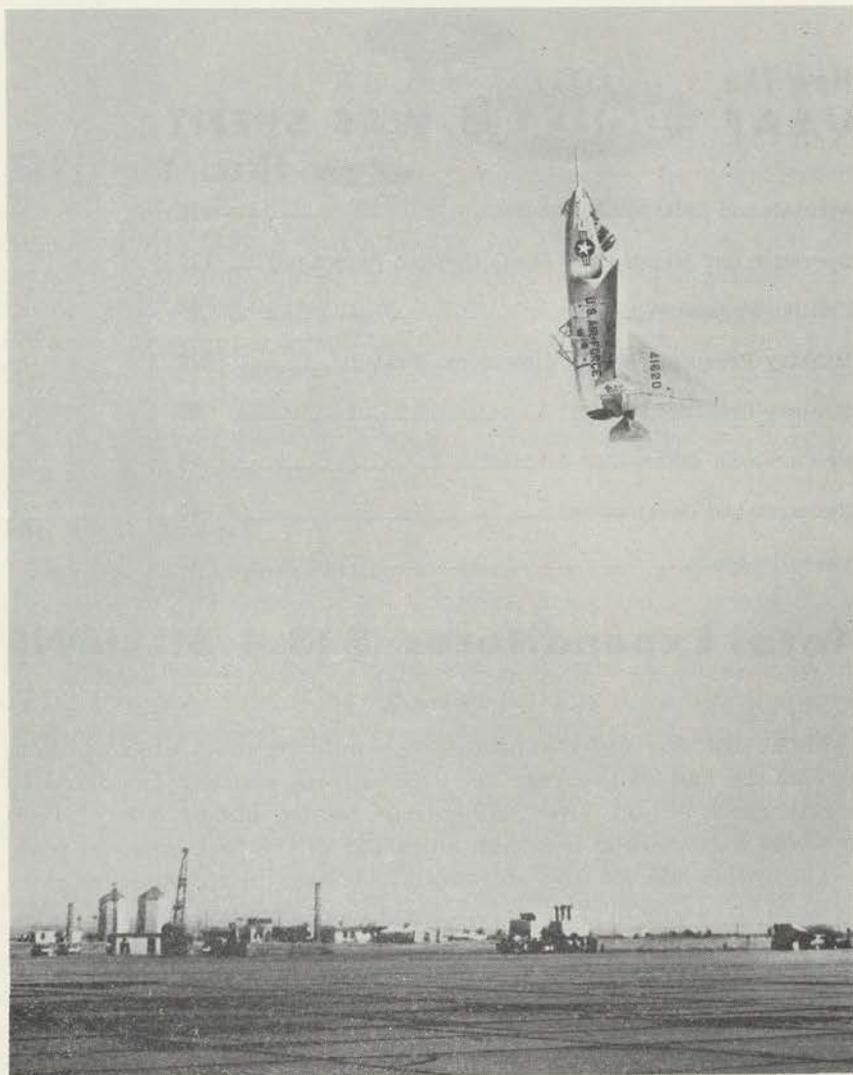


Figure 20. The X-13 Vertijet.

Budget notified the Air Force that the submission of the supplemental request would not be authorized. This required the Air Force to absorb within the 3 remaining months of fiscal year 1957 the costs of operating the Medical Care Act for almost 7 months. Accordingly, after exhausting all other means of meeting the threatened deficit in the operation and maintenance category, the Air Force authorized its commanders to curtail their flying hour programs where necessary for the rest of the fiscal year.

The following table summarizes the funds in direct appropriations available to the Air Force for obligation funding fiscal year 1957:

Department of Defense Appropriation Act, 1957, Public Law 639, 84th Congress.....	* \$16,431,025,000
Supplementary Appropriation Act, 1957, Public Law 814, 84th Congress.....	1,246,500,000
<hr/>	
Total new obligational authority enacted.....	<sup>a</sup> 17,677,525,000
Unobligated balance of prior year programs.....	5,730,365,550
Unobligated balance of appropriation transfer accounts.....	8,805,560
Transfer from Operation and Maintenance, Air Force, to Maintenance and Operations, Army.....	<sup>b</sup> -3,765,582
Transfer from Emergency Fund, Department of Defense, to Research and Development, Air Force.....	13,968,500
Anticipated reimbursements.....	598,342,321
<hr/>	
Total available for obligation during fiscal year 1957.....	24,025,241,349

<sup>a</sup> Reflects adjustment by Treasury of \$28.1 million of 1957 Military Personnel funds applied to 1956 Military Personnel account, effective June 30, 1956.

<sup>b</sup> Reflects adjustment of \$9.3 million of 1957 Operation and Maintenance fund common-item orders for Military Air Program applied to Operation and Maintenance 1958 program, effective June 30, 1957.

The following table summarizes the expenditures by the Air Force during fiscal 1957 under the various principal fund divisions:

	<i>(In millions)</i>
Aircraft and Related Equipment.....	\$7,401.3
Procurement Other Than Aircraft.....	932.9
Military Construction.....	1,082.7
Operation and Maintenance.....	4,084.8
Military Personnel.....	3,709.2
Research and Development.....	728.5
Miscellaneous.....	423.3
<hr/>	
Total expenditures.....	18,362.7

### The 1958 Budget

The President's budget (as amended) for fiscal year 1958 requested almost \$17.5 billion for the Air Force, including \$1 billion for military construction. As passed by Congress, the new Department of Defense budget provided \$16.8 billion in new obligational authority for the Air Force, including \$900 million for military construction. Since expenditures were running at a rate close to \$19 billion, it was immediately necessary to restrict expenditures for operation and maintenance and to modify previously planned manpower and procurement programs for 1958. Drastic changes were necessary in many programs already under way, but efforts were made to limit their effects on our long-range defense position and to avoid any major disruption of current combat capability.

*Malcolm A. MacIntyre*

MALCOLM A. MACINTYRE,  
Under Secretary of the Air Force





DEPARTMENT OF DEFENSE

TABLE 1. OBLIGATIONS AND OBLIGATIONAL AVAILABILITY OF CURRENT GENERAL AND SPECIAL FUND APPROPRIATIONS, BY APPROPRIATION TITLE

(Excluding working, revolving, and expired general and special fund appropriations)

Fiscal Year 1957

[Thousands of dollars]

Department and appropriation	Amounts available for obligation, fiscal year 1957										Unobligated balances as of June 30, 1957			
	Unobligated balance brought forward July 1, 1956 (2)	New obligational availability			Other transfers and rescissions (6)	Reimbursements (7)	Expired balance withdrawn June 30, 1957 (8)	Total, fiscal year 1957 (9)	Total obligation for fiscal year 1957 (10)	Balance of appropriation and funds otherwise available (11)	Reserves (12)	Other unobligated balances (13)	Total unobligated balance June 30, 1957 (14)	
		Congressional appropriations (3)	Transfers (4)	Total (5)										
DEPARTMENT OF DEFENSE:														
General Fund														
Accounts:														
All appropriations other than Military Construction.....	11,535,595	34,735,127	79,753	34,814,880	-46,110 R -50,444 T	2,475,296	-257,162	48,472,056	38,285,093	4,742,649	5,479,425	-35,110	10,186,963	
Special Fund Accounts.....	2,227	46,996	-----	46,996	-----	29	-----	49,253	46,950	2,303	-----	-----	2,303	
Subtotal.....	11,537,822	34,782,123	79,753	34,861,876	-46,110 R -50,444 T	2,475,326	-257,162	48,521,309	38,332,043	4,744,952	5,479,425	-35,110	10,189,266	

Military Construction Accounts.....	842,158	1,398,450	406,665	1,805,115	13,907	2,661,181	1,949,643	515,702	198,203	-2,367	711,538
<b>TOTAL—</b> Department of Defense.....	12,379,981	36,180,573	486,418	36,666,991	-46,110 R -50,444 T	51,182,489	40,281,685	5,260,664	5,677,627	-37,477	10,900,804
<b>OSD AND INTER-SERVICE ACTIVITIES:</b>											
Salaries and Expenses, OSD.....		14,500		14,500		13,491					
Salaries and Expenses, OPA.....		450		450		447					
Claims.....		11,000		11,000		9,020					
Construction of Ships, MSTs.....	11,631					11,631		625	9,631		10,255
Contingencies.....		32,500		32,500		7,973					
Emergency Fund.....		85,000	-73,272	11,728							
Retired Pay.....		515,000		515,000		510,784					
Salaries and Expenses, Court of Military Appeals.....		375		375		331					
Subtotal.....	11,631	658,825	-73,272	585,553		553,676	543,421	625	9,631		10,255
Military Construction, Foreign Countries.....											
Family Housing.....	6,445					6,445	3,134	3,311			3,311
Access Roads.....	2,450					2,450	423	2,027			2,027
Loran Stations.....		5,450		5,450		5,450	5,450				
<b>TOTAL—OSD and Interservice Activities.....</b>	20,526	664,275	-73,272	591,003		568,021	552,428	5,962	9,631		15,593

See footnotes at end of table.

## MILITARY FUNCTIONS

## OBLIGATIONS

TABLE 1. OBLIGATIONS AND OBLIGATIONAL AVAILABILITY OF CURRENT GENERAL AND SPECIAL FUND APPROPRIATIONS, BY APPROPRIATION TITLE—Continued

Fiscal Year 1957—Continued

[Thousands of dollars]

(1) Department and appropriation	(2) Unobligated balance brought forward July 1, 1956	(3) New obligational availability			(4) Amounts available for obligation, fiscal year 1957					(5) Unobligated balances as of June 30, 1957				
		(3) Congressional appropriations	(4) Transfers	(5) Total	(6) Other transfers and rescissions	(7) Reimbursements	(8) Expired balance withdrawn June 30, 1957	(9) Total, fiscal year 1957	(10) Total obligation for fiscal year 1957	(11) Balance of appropriation and funds otherwise available	(12) Reserves	(13) Other unobligated balances	(14) Total unobligated balance June 30, 1957	
DEPARTMENT OF THE ARMY:														
Military Personnel		3,566,704	27,435	3,594,139		164,819		3,758,958	3,759,348	b-390			b-390	
Maintenance and Operations	8,009	3,055,057	3,007	3,058,064		394,001	-47,721	3,412,353	3,327,360			84,963	84,963	
Procurement and Production	2,524,767					856,158		3,453,481	1,857,590	108,410	1,401,104	26,377	1,595,891	
Military Construction, Army Reserve Forces	24,228	55,000		55,000				79,228	51,152	25,228	2,847		28,076	
Reserve Personnel		215,000		215,000		500	-26,436	189,064	179,064			10,000	10,000	
Army National Guard		320,162		320,162		969	-13,973	307,158	307,158					
Research and Development	28,552	410,000	22,674	432,674		9,190		470,416	436,587	34,638		-810	33,828	
Promotion of Rifle Practice		357		357			-118	239	239					





Medical Care.....	61,323	10,000	71,323	-1,853	89,645	89,645	4,528	4,528
Civil Engineering Military	2,432	129,600	129,600	-3,136	156,735	156,735		
Construction, Naval Reserve Forces.....	35,397	9,704	9,704		19,376	14,817	10,908	(*)
Construction, Water Supply Facilities.....	1,882				(*)			(*)
Research and Development.....	19,002	49,630	541,630		593,408	16,285	7,400	-910
Service-Wide Supply and Finance.....	202	289,644	297,486	-609	310,891			748
Service-Wide Operations.....		102,485	102,485	-4,100	102,350			
Naval Petroleum Reserves.....		683	683	-175	508			
Prep. for Sale or Salvage of Military Property.....		10,933	10,933		10,933			
Ships' Stores Profits.....	2,227	8,302	8,302		8,226	2,303		2,303
Subtotal.....	3,543,657	10,018,732	10,078,104	-92,069	13,818,933	1,844,449	1,477,067	39,294
Military Construction, Navy.....	185,795	165,000	400,000		585,842	101,086	77,995	-1,153
TOTAL— Department of the Navy...	3,729,452	10,183,732	10,478,104	-92,069	14,404,775	1,945,534	1,555,062	38,140
								3,538,737

See footnotes at end of table.



Prep. for Sale or Salvage of Military Property	8,775			1		8,776					
Subtotal	5,395,008	16,458,300	40,538	591,269	-32,712	22,452,403	17,387,493	2,671,884	2,588,025	-194,999	5,094,910
Military Construction, Air Force	344,163	1,228,000	-30,385	7,074		1,548,902	1,181,891	267,109	99,902		367,012
Total—Department of the Air Force	5,739,171	17,686,300	10,203	598,343	-32,712	24,001,305	18,569,383	2,938,993	2,687,927	-194,999	5,431,922

SOURCE: Standard Form 133.

Note. Amounts will not necessarily add to totals due to rounding.

<sup>a</sup> Excludes \$28,100,000 appropriated to the account "Military Personnel, Air Force, 1956" by warrant action retroactive to June 30, 1956.

<sup>b</sup> The specific action required to eliminate this credit unobligated balance will be determined at a later date.

<sup>c</sup> This amount approved for transfer to Reserve Personnel, Army, fiscal year 1958, by P. L. 85-117.

\* Less than \$500.

## EXPENDITURES

## MILITARY FUNCTIONS

## DEPARTMENT OF DEFENSE

TABLE 2. EXPENDITURES AND EXPENDITURE AVAILABILITY, BY APPROPRIATION TITLE

Fiscal Year 1957

[Thousands of dollars]

(1)	(2)	Amounts available for expenditure fiscal year 1957			(6)	(7)	(8)	(9)	(10)	Gross un- paid obligations carried into fiscal year 1958 <sup>a</sup>
		(3)	(4)	(5)						
Department and appropriation	Unex- pended balance carried in- to fiscal year 1957	New obligational availability		Other trans- fers and re- scissions	Unobligated balance with- drawn (-) or restored (+) per PL 798	Total fiscal year 1957	Total ex- pended in fiscal year 1957	Total un- expended balance carried into fiscal year 1958		
		Congres- sional appropri- ations	Transfers							Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
DEPARTMENT OF DEFENSE:										
General Fund Accounts.....	33,318,201	34,735,127	79,753	34,814,880	-46,110 R 312,454 T	-1,278,186	67,121,240	36,826,087	30,265,154	23,343,862
Special Fund Accounts.....	15,834	46,996		46,996	76 T	-10,377	52,529	45,014	7,515	4,705
Management Funds.....	287,050				9,631 T	-1,995	294,686	83,845	210,841	175,390
Stock Funds.....	1,513,618				-510,000 R		696,618	-419,694	986,312	992,348
Industrial Funds.....	641,491				-437,000 T		479,491	-2,722	482,213	
Other Revolving Funds.....	25,086		75,000	75,000	-162,000 R	-4	100,457	8,859	91,598	9,559
Consolidated Working Funds.....	16,015				242 T	-26	16,231	10,620	5,610	1,774
Subtotal.....	35,817,296	34,782,123	154,753	34,936,876	-718,110 R -114,222 T	-1,290,588	68,631,252	36,552,010	32,079,243	24,527,639
Military Construction Appropriations.....	2,672,969	1,398,450	406,665	1,805,115			4,478,084	1,886,881	2,591,253	1,888,818
TOTAL—Standard Form 133 Basis.....	38,490,265	36,180,573	561,418	36,741,991	-718,110 R -114,222 T	-1,290,588	73,109,336	38,438,841	34,070,496	26,411,457

Nonclassified Items.....	-562,444	-562,444	718,110 R 562,447 T	-718,110 R -10,231 T	-10,228	a-10,228	-----
TOTAL--Department of Defense (Treasury Basis).....	38,490,265	36,180,573	448,225 T	-718,100 R -1,300,819 T	73,099,108	38,438,841	34,660,268
OSD AND INTERSERVICE ACTIVITIES:							
<i>General Fund Accounts:</i>							
Salaries and Expenses, OSD.....	918	14,500	22 T	-1,204	14,236	13,172	1,064
Salaries and Expenses, OPA.....	76	450	*T	-51	475	435	40
Claims.....	6,087	11,000		-7,596	9,490	8,902	589
Construction of Ships, MSTSS.....	55,694				55,694	31,378	24,316
Contingencies.....	58,558	32,500	3 T	-70,633			14,069
Emergency Funds.....	8,644	85,000		-20,372	20,428	11,674	8,755
Reserve Tools and Facilities.....	184,655			-184,655			
Retired Pay.....	25,495	515,000	23,042 T	-24,917	538,622	511,182	27,440
Salaries and Expenses, Court of Military Appeals.....	52	375	*T	-70	356	330	26
Miscellaneous "M" Accounts for discontinued Appropriation Titles.....							
<i>Other Recombing Fund:</i>							
Acquisition, Rehabilitation, and Rental of Wherry Act Housing, Defense.....							
Consolidated Working Fund.....							
Subtotal.....	340,180	658,825	23,067 T	-309,498	714,302	577,143	137,159
Military Construction, Foreign Countries.....	62,547				62,547	6,481	56,066
Access Roads.....	9,521				9,521	4,009	2,884
Family Housing.....	27,215				27,215	21,477	5,737
Loran Stations.....		5,450			5,450		
TOTAL--Standard Form 133 Basis.....	439,463	664,275	23,067 T	-309,498	819,035	615,161	203,873
Nonclassified Items.....			75,000 T				
TOTAL--OSD and Interservice Activities (Treasury Basis).....	439,463	664,275	98,067 T	-309,498	819,035	615,161	203,873

See footnotes at end of table.

TABLE 2. EXPENDITURES AND EXPENDITURE AVAILABILITY, BY APPROPRIATION TITLE—Continued  
 Fiscal Year 1957—Continued  
 [Thousands of dollars]

(1)	(2)	Amounts available for expenditure fiscal year 1957			(6)	(7)	(8)	(9)	(10)	(11)
		(3)	(4)	(5)						
Department and appropriation	Unexpended balance carried into fiscal year 1957	New obligational availability			Other transfers and rescissions	Unobligated balance withdrawn (-) or restored (+) per PL 798	Total fiscal year 1957	Total expended in fiscal year 1957	Total unexpended balance carried into fiscal year 1958	Gross unpaid obligations carried into fiscal year 1958
		Congressional appropriations	Transfers	Total						
<b>DEPARTMENT OF THE ARMY:</b>										
<i>General Fund Account:</i>										
Military Personnel.....	297,898	3,566,704	27,435	3,594,139	89,741 T	-203,695	3,778,083	3,586,956	191,126	205,734
Maintenance and Operations.....	831,790	3,055,057	3,007	3,058,064	-45,959 T	-136,243	3,707,653	2,884,723	822,930	857,721
Procurement and Production.....	5,247,234				-26,448 T		5,220,786	1,603,153	3,617,633	2,962,096
Military Construction, Army Reserve Forces.....	56,889	55,000		55,000	68 T	-21	111,936	40,663	71,273	43,197
Reserve Personnel.....	40,159	215,000		215,000	4,109 T	-46,382	212,886	164,619	48,267	38,267
Army National Guard.....	97,067	320,162		320,162	723 T	-63,926	354,026	294,168	59,859	59,859
Research and Development.....	310,102	410,000	22,674	432,674	686 T	-145	743,316	435,084	308,232	278,580
Promotion of Rifle Practice.....	55	357		357		-121	236	203	88	88
Operation and Maintenance—Alaska Communication System.....	3,081	5,000		5,000	* T	-1,122	6,959	5,802	1,008	1,035
Construction, Alaska Communication System.....	1,361						1,361	93	1,268	411
Miscellaneous "M" Accounts for Discontinued Appropriation Titles.....					11,451 T	-10,353	1,118	-753	1,871	1,871
<i>Special Fund Account:</i>										
Preparation for Sale/Salvage of Military Property.....	5,772	18,986		18,986	* T	-3,975	20,783	18,900	1,885	1,983

Miscellaneous "M" Accounts for Discontinued Appropriation Titles Management Fund.....	2,802				28 T -996 T	-28	1,806	1,024	782	961
<i>Business Enterprise Accounts:</i>										
Stock Fund.....	615,781				-357,000 R -202,000 T -110,000 R		56,781	-362,618	419,400	429,742
Industrial Fund.....	337,584						227,584	-31,848	259,432	
<i>Other Revolving Funds:</i>							96	96		
Replacing Quartermaster Supplies.....	96					-4				
Replacing Engineer Supplies.....	4									
Defense Housing.....							16,010	10,460	5,550	1,713
Consolidated Working Fund.....	15,962				80 T	-63				
Subtotal.....	7,893,666	7,646,266	53,115	7,699,381	-467,000 R -168,516 T	-466,056	14,461,475	8,650,151	5,811,324	4,914,043
Military Construction.....	712,172		292,000	202,000			914,172	412,538	501,634	340,419
TOTAL—Standard Form 133 Basis.....	8,575,838	7,646,266	255,115	7,901,381	-467,000 R -168,516 T	-466,056	15,375,647	9,062,689	6,312,957	5,254,462
Nonclassified items.....				-229,444	467,000 R 229,444 T	-467,000 R -10,228 T	-10,228		b -10,228	
TOTAL—Department of the Army (Treasury Basis).....	8,575,838	7,646,266	25,671	7,671,937	60,928 T	-467,000 R -476,285 T	15,365,418	9,062,689	6,302,729	
DEPARTMENT OF THE NAVY: <i>General Fund Accounts:</i>										
Military Personnel, Navy.....	84,746	2,478,316		2,478,316	4,281 T	-54,230	2,513,113	2,465,318	47,795	52,666
Reserve Personnel, Navy.....	33,070	95,000	-5,000	90,000	236 T	-23,974	99,332	83,405	15,927	15,927
Navy Personnel, General Expenses.....	12,746	83,980		83,980	221 T	-3,486	93,461	82,416	11,045	13,750
Military Personnel, Marine Corps.....	99,144	647,100	-3,000	644,100	176 T	-92,664	650,756	615,127	35,630	35,751
Reserve Personnel, Marine Corps.....	10,778	26,800		26,800	10 T	-12,859	24,729	19,970	4,759	4,921
Marine Corps Troops and Facilities.....	76,887	171,820	-100	171,720	2,624 T	-46,315	210,916	168,043	42,873	44,856
Marine Corps Procurement.....	775,641	164,000		164,000			939,641	299,913	729,728	356,830
Aircraft and Facilities.....	318,573	810,772		810,772	88,549 T	-58,125	1,159,709	880,551	279,219	299,747
Aircraft and Related Procurement.....	5,417,977	1,732,900		1,732,900			7,150,877	2,172,764	4,978,113	3,315,341
Ships and Facilities.....	276,100	766,040		766,040	71,477 T	-16,503	1,097,114	855,160	241,955	247,643
Construction of Ships.....	96,158				-22,228 R	-6,786	44,143	16,930	27,214	27,214

See footnotes at end of table.

## EXPENDITURES

## MILITARY FUNCTIONS

TABLE 2. EXPENDITURES AND EXPENDITURE AVAILABILITY, BY APPROPRIATION TITLE—Continued  
 Fiscal Year 1957—Continued  
 [Thousands of dollars]

(1) Department and appropriation	(2) Unexpended balance carried into fiscal year 1957	(3) New obligational availability				(4) Transfers	(5) Total	(6) Amounts available for expenditure fiscal year 1957				(7) Unobligated balance withdrawn (-) or restored (+) per P.L. 798	(8) Total fiscal year 1957	(9) Total expended in fiscal year 1957	(10) Total unexpended balance carried into fiscal year 1958	(11) Gross unpaid obligations carried into fiscal year 1958 <sup>a</sup>
		(3) Congressional appropriations	(4) Transfers	(5) Total	(6) Other transfers and rescissions			(7) Unobligated balance withdrawn (-) or restored (+) per P.L. 798	(8) Total fiscal year 1957	(9) Total expended in fiscal year 1957	(10) Total unexpended balance carried into fiscal year 1958					
<b>DEPARTMENT OF THE NAVY—Con.</b>																
<i>General Fund Accounts—Continued</i>																
Shipbuilding and Conversion.....	2,532,891	1,479,700		1,479,700		1,479,700	27,420 T					4,012,591	916,909	3,095,682	2,157,811	
Ordnance and Facilities.....	68,532	163,680		163,680		163,680	-22,000 R					240,748	172,689	68,059	69,621	
Ordnance for New Construction.....	40,790											11,089	3,667	7,392	7,392	
Procurement of Ordnance and Ammunition.....	455,512	294,000		294,000		294,000						749,512	309,455	440,057	433,783	
Medical Care.....	7,241	61,323	10,000	71,323		71,323	575 T					73,210	68,535	4,675	10,098	
Civil Engineering.....	31,839	129,600		129,600		129,600	990 T					158,577	138,681	19,896	30,701	
Military Construction, Naval Reserve Forces.....	47,077	9,704		9,704		9,704						56,781	15,304	41,477	15,752	
Construction, Water Supply Facilities, Facilities.....	1,882						-1,882 R					(*)	(*)	(*)	(*)	
Research and Development.....	932						2,978 T					3,834	1,529	2,305	2,305	
Service-Wide Supply and Finance.....	332,187	492,000	46,630	541,630		541,630	105 T					873,922	522,618	351,304	350,856	
Service-Wide Operations.....	31,433	289,644	7,842	297,486		297,486	318 T					311,755	297,412	14,344	16,959	
Naval Petroleum Reserves.....	22,063	102,435		102,435		102,435	6,106 T					122,070	95,971	26,099	26,871	
Miscellaneous "M" Accounts for Discontinued Appropriation Titles.....	3,232	683		683		683						3,294	2,127	1,167	1,167	
							1,562 T					1,443	451	991	991	





Military Construction, Air Force.....	1, 320, 897	1, 228, 000	-80, 335	1, 197, 665			2, 518, 562	1, 082, 707	1, 435, 856	1, 072, 900
TOTAL.—Standard Form 133 Basis..	17, 080, 430	17, 086, 300	10, 203	17, 096, 503	-50, 000 R 80, 592 T	-138, 123	34, 078, 402	18, 362, 675	16, 315, 727	12, 629, 388
Nonclassified Items.....					50, 000 R 3 T	-50, 000 R -3 T				
TOTAL.—Department of the Air Force (Treasury Basis).....	17, 080, 430	17, 086, 300	10, 203	17, 096, 503	80, 594 T	-50, 000 R -138, 126 T	34, 078, 402	18, 362, 675	16, 315, 727	

SOURCE: Standard Form 133.

Note: Amounts will not necessarily add to totals due to rounding.

\* Less than \$500.

<sup>a</sup> Amounts in this column are gross, i. e., inclusive of reimbursements receivable and anticipated, and, thus, may exceed the cash unexpended balance in column (10).  
<sup>b</sup> Represents amounts continued available for obligation in fiscal year 1968 which were reported in the Treasury Combined Statement (preliminary) as having been written off on June 30, 1957 but available for reappropriation in fiscal year 1968.

<sup>c</sup> Excludes \$28,100,000 appropriated to the account "Military Personnel, Air Force, 1956" by warrant action retroactive to June 30, 1956.

## DEPARTMENT OF DEFENSE CIVIL FUNCTIONS

TABLE 3. OBLIGATIONS AND OBLIGATIONAL AVAILABILITY OF CURRENT GENERAL APPROPRIATIONS, BY APPROPRIATION TITLE

(Excluding working, revolving, and special funds and expired general appropriations)

Fiscal Year 1957

[Thousands of dollars]

Appropriation	Amount available for obligation, fiscal year 1957					Total obligations fiscal year 1957	Unobligated balance available in fiscal year 1958
	Unobligated balance carried into fiscal year 1957	Congressional appropriations	Reimbursements	Expired balance withdrawn June 30, 1957 per P.L. 798	Total fiscal year 1957		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DEPARTMENT OF DEFENSE—TOTAL.....	101,311	648,457	4,980	-254	754,494	639,057	115,436
DEPARTMENT OF THE ARMY: Total, Corps of Engineers.....	75,578	639,182	4,974	-114	719,020	616,131	103,489
Flood Control, Mississippi River and Tributaries.....	1,181	62,791	48	-----	64,020	58,575	5,445
General Investigations.....	709	9,322	5	-----	10,035	8,835	1,200
Construction, General.....	60,698	458,470	3,874	-----	523,042	431,021	92,020
Operation and Maintenance, General.....	10,573	95,900	974	-----	107,446	104,492	2,955
General Expenses.....	-----	10,400	23	-50	10,373	10,373	-----
Hydraulic Mining in California, Debris Fund.....	3	36	-----	-----	39	26	14
Niagara Remedial Works.....	789	500	50	-----	1,340	1,098	241
Maintenance and Operation of Dams and Other Improvements of Navigable Waters.....	152	152	-----	-----	304	152	152

United States Section, St. Lawrence River Joint Board of Engineers.....	150	-64	86	86	1,461
Payments to State Flood Control Act, June 28, 1938, as amended.....	1,461		1,472	1,472	1,461
Cemeterial Expenses.....	6,766		6,667	6,667	(*)
Government and Relief in Occupied Areas.....	2,350		2,315	2,315	
Payments to Claimants, Disaster at Texas City, Texas.....			25,733	25,733	11,789
Entombment of Unknown Americans of World War II and Korea.....	159		159	159	159
Total—Department of the Army.....	648,457	-254	754,494	639,057	115,436
DEPARTMENT OF THE NAVY.....					
DEPARTMENT OF THE AIR FORCE.....					

\* Less than \$500.

Note: Amounts will not necessarily add to totals due to rounding.

## EXPENDITURES

## CIVIL FUNCTIONS

## DEPARTMENT OF DEFENSE CIVIL FUNCTIONS

TABLE 4. EXPENDITURES AND EXPENDITURE AVAILABILITY, BY APPROPRIATION TITLE

Fiscal Year 1957

[Thousands of dollars]

Appropriation	Amounts available for expenditure, fiscal year 1957						Gross un- paid obli- gations carried into fiscal year 1958
	(2)	(3)	(4)	(5)	(6)	(7)	
(1)	Unex- pended balance carried into fiscal year 1957	Congres- sional appropri- ations	Transfers	Unobli- gated balance withdrawn (-) or re- stored (+) per PL 798	Total fiscal year 1957	Total ex- penditures fiscal year 1957	Unex- pended balance carried into fiscal year 1958
DEPARTMENT OF DEFENSE--TOTAL.....	291,176	648,479	227	-724	939,159	631,372	307,787
DEPARTMENT OF THE ARMY:							
Total, Corps of Engineers.....	246,161	639,182		-303	885,040	609,859	168,129
Flood Control, Mississippi River and Tributaries.....	8,615	62,791			71,406	57,540	13,866
General Investigations.....	1,262	9,322			10,584	8,476	2,108
Construction, General.....	181,187	458,470			639,657	430,374	209,282
Operation and Maintenance, General.....	23,477	95,900			119,377	101,700	17,678
General Expenses.....	715	10,400		-132	10,983	10,279	704
Hydraulic Mining in California, Debris Fund.....	3	36			39	23	17
Niagara Remedial Works.....	866	500			1,366	1,078	288
Maintenance and Operation of Dams and Other Improvements of Navigable Waters.....	152	152			304	152	152
United States Section, St. Lawrence River Joint Board of Engineers.....	113	150		-170	92	87	6
Payments to State Flood Control Act, June 28, 1935, as amended.....	1,472	1,461			2,934	1,472	1,461
Revolving Fund.....	28,295				28,295	-1,325	29,620
Consolidated Working Funds.....	4			-1	3	3	23,049

Cemeterial Expenses.....	1,391	6,766	(*)	-210	7,947	6,059	1,248	1,248
Entombment of Unknown Americans of World War II and Korea.....		159			159		159	
Civilian Relief in Korea.....			38		38	8	30	30
Payments to Claimants, Disaster at Texas City, Texas.....	26,246				26,286	14,467	11,789	
Government and Relief in Occupied Areas.....	447	2,350	188	-210	2,776	2,557	219	219
Defense Production Guarantees.....	2,540				2,540	622	1,918	
Total—Department of the Army.....	276,796	648,457	227	-724	924,756	634,212	290,544	169,626
DEPARTMENT OF THE NAVY:								
Defense Production Guarantees.....	6,878				6,878	-1,091	7,969	
DEPARTMENT OF THE AIR FORCE:								
Defense Production Guarantees.....	7,485				7,485	-1,772	9,257	
Wildlife Conservation, etc., Eglin Field Reservation.....	18	23			41	24	17	
Total—Department of the Air Force.....	7,503	23			7,526	-1,749	9,274	

\*Less than \$500.

Note: Amounts will not necessarily add to totals due to rounding.

TABLE 5. MILITARY ASSISTANCE PROGRAM FUNDS STATUS OF OBLIGATIONS/RESERVATIONS BY BUDGET ACTIVITY

July 1, 1949—June 30, 1957

[Millions of dollars]

Major Classification	Obligations/Reservations		
	Fiscal years 1950-56	Fiscal year 1957	Total as of June 30, 1957
Total.....	\$19,184.5	\$1,655.6	\$20,840.1
Equipment and Supplies.....	16,940.7	1,172.9	18,113.6
Accessorial Charges.....	746.4	125.8	872.2
Training.....	366.3	55.2	421.5
Facilities Assistance.....	74.9	5.0	80.0
Development of Advance Design Weapons.....	79.1	35.2	114.3
Infrastructure.....	469.8	57.8	527.6
Administrative Expenses.....	122.5	16.3	138.8
International Military Headquarters.....	22.7	5.3	28.0
Other Services.....	362.1	182.0	544.1

Note. Includes reimbursements of \$5.7 million. Totals are based on unrounded amounts, hence may vary from totals of rounded amounts.

TABLE 6. MILITARY ASSISTANCE PROGRAM FUNDS STATUS OF EXPENDITURES BY BUDGET ACTIVITY

July 1, 1949—June 30, 1957

[Millions of dollars]

Major Classification	Expenditures		
	Fiscal year 1950-56	Fiscal year 1957	Total as of June 30, 1957
Total.....	\$14,871.2	\$2,282.4	\$17,153.5
Equipment and Supplies.....	13,041.7	1,946.2	14,987.9
Accessorial Charges.....	709.1	132.7	841.8
Training.....	320.5	52.7	373.2
Facilities Assistance.....	1.7	10.7	12.4
Development of Advance Design Weapons.....	14.3	22.6	37.0
Infrastructure.....	332.5	59.6	392.1
Administrative Expenses.....	117.6	15.9	133.5
International Military Headquarters.....	19.2	5.3	24.6
Other Services.....	314.6	36.6	351.2

Note. Includes reimbursements of \$5.7 million. Totals are based on unrounded amounts, hence may vary from totals of rounded amounts.

TABLE 7. MILITARY ASSISTANCE PROGRAM FUNDS: OBLIGATIONS/RESERVATIONS AND EXPENDITURES BY DEPARTMENT OF DEFENSE AGENCY

July 1, 1949—June 30, 1957

[Millions of dollars]

	Obligated or reserved		Expended	
	Total as of June 30, 1956	Total as of June 30, 1957	Total as of June 30, 1956	Total as of June 30, 1957
Department of Defense.....	\$19,184.5	\$20,840.1	\$14,871.2	\$17,153.5
Army.....	10,148.2	11,119.6	8,969.3	9,832.1
Navy.....	2,197.4	2,432.5	1,758.5	1,971.9
Air Force.....	6,161.9	6,511.7	3,672.1	4,789.7
OSD.....	677.0	776.3	471.3	559.9

Note. Includes reimbursements of \$5.7 million. Totals are based on unrounded amounts, hence may vary from totals of rounded amounts.

TABLE 8. ACTIVE DUTY MILITARY PERSONNEL, FISCAL YEAR 1957

Month	Total, Department of Defense	Army	Navy	Marine Corps	Air Force
TOTAL					
June 30, 1956.....	2,806,441	1,025,778	669,925	200,780	909,958
Dec. 31.....	2,780,723	992,290	673,065	200,770	914,598
Jan. 31, 1957.....	2,787,461	993,393	676,043	199,627	918,398
Feb. 28.....	2,787,876	997,254	676,435	198,891	915,296
Mar. 31.....	2,791,879	1,001,242	678,326	198,138	914,173
Apr. 30.....	2,791,605	1,001,061	678,019	197,721	914,804
May 31.....	2,789,830	1,000,151	675,861	197,369	916,449
June 30.....	2,795,798	997,994	677,108	200,861	919,835
OFFICERS					
June 30, 1956.....	350,036	118,364	71,770	17,809	142,093
Dec. 31.....	349,318	117,823	72,827	17,372	141,296
Jan. 31, 1957.....	348,836	117,165	72,397	17,269	142,005
Feb. 28.....	347,588	116,482	72,242	17,152	141,662
Mar. 31.....	346,858	115,359	72,733	17,316	141,450
Apr. 30.....	345,286	114,028	72,605	17,226	141,427
May 31.....	343,596	112,707	72,891	16,997	141,001
June 30.....	342,887	111,187	73,703	17,434	140,563
ENLISTED					
June 30, 1956.....	2,445,219	905,711	591,996	182,971	764,541
Dec. 31.....	2,418,272	872,051	592,764	183,398	770,059
Jan. 31, 1957.....	2,424,781	873,849	595,482	182,358	773,092
Feb. 28.....	2,427,794	878,401	597,320	181,739	770,334
Mar. 31.....	2,432,383	883,517	598,470	180,822	769,574
Apr. 30.....	2,433,817	884,671	598,313	180,495	770,338
May 31.....	2,434,402	885,108	596,352	180,372	772,570
June 30.....	2,442,849	885,056	597,859	183,427	776,507
OFFICER CANDIDATES <sup>1</sup>					
June 30, 1956.....	11,186	1,703	6,159	-----	3,324
Dec. 31.....	13,133	2,416	7,474	-----	3,243
Jan. 31, 1957.....	13,844	2,379	8,164	-----	3,301
Feb. 28.....	12,544	2,371	6,873	-----	3,300
Mar. 31.....	12,638	2,366	7,123	-----	3,149
Apr. 30.....	12,502	2,362	7,101	-----	3,039
May 31.....	11,832	2,336	6,618	-----	2,878
June 30.....	10,062	1,751	5,546	-----	2,765

<sup>1</sup> Consists of cadets, U. S. Military Academy (Army); midshipmen, U. S. Naval Academy, aviation cadets, and enlisted officer candidates OC and AOC (Navy); and cadets, U. S. Air Force Academy, and aviation cadets, including enlisted aviation students (Air Force).

TABLE 9. RESERVE COMPONENTS PERSONNEL, JUNE 1956 AND JUNE 1957

[Excludes personnel on extended active duty]

	June 30, 1956		June 30, 1957	
	Total enrollment	In drill pay status	Total enrollment	In drill pay status
TOTAL, DEPARTMENT OF DEFENSE.	3,581,173	912,837	3,631,671	1,000,079
DEPARTMENT OF THE ARMY.....	2,396,094	601,743	2,281,272	682,555
National Guard.....	<sup>a</sup> 420,535	404,403	<sup>a</sup> 441,798	422,178
Officers.....	40,010	34,899	41,801	36,795
Enlisted.....	380,525	369,504	399,997	385,383
Army Reserve.....	1,975,559	197,340	1,839,474	260,377
Officers.....	196,545	68,588	212,908	73,308
Enlisted.....	1,779,014	128,752	1,626,566	187,069
DEPARTMENT OF THE NAVY.....	777,281	193,349	854,033	187,897
Naval Reserve.....	547,640	150,193	583,733	141,747
Officers.....	197,074	26,607	179,303	27,728
Enlisted.....	<sup>b</sup> 350,566	123,586	<sup>b</sup> 404,430	114,019
Marine Corps Reserve.....	229,641	43,156	270,300	46,150
Officers.....	27,904	3,984	28,939	4,106
Enlisted.....	201,737	39,172	241,361	42,044
DEPARTMENT OF THE AIR FORCE...	407,798	117,745	496,366	129,627
Air National Guard.....	63,534	63,534	67,950	67,950
Officers.....	7,300	7,300	8,033	8,033
Enlisted.....	56,234	56,234	59,917	59,917
Air Force Reserve.....	344,264	54,211	428,416	61,677
Officers.....	147,733	30,438	144,121	32,759
Enlisted.....	196,531	23,773	284,295	28,918

<sup>a</sup> Includes "Inactive" National Guard.<sup>b</sup> Includes Regular NROTC and Merchant Marine midshipmen.

TABLE 10. CIVILIAN PERSONNEL, DEPARTMENT OF DEFENSE  
FISCAL YEAR 1957

Month	Total, Department of Defense	Office of Secretary of Defense	Department of the Army	Department of the Navy	Department of the Air Force
A. DIRECT HIRE EMPLOYEES <sup>a</sup>					
1956					
June 30.....	1, 179, 489	1, 899	434, 691	394, 669	348, 230
Dec. 31.....	1, 175, 915	1, 690	430, 212	393, 332	350, 681
1957					
Jan. 31.....	1, 174, 019	1, 680	429, 007	393, 677	349, 655
Feb. 28.....	1, 172, 146	1, 667	428, 698	393, 134	348, 647
Mar. 31.....	1, 167, 987	1, 672	428, 343	391, 928	346, 044
Apr. 30.....	1, 164, 717	1, 658	427, 998	390, 880	344, 181
May 31.....	1, 160, 453	1, 655	428, 290	389, 013	341, 495
June 30.....	1, 160, 915	1, 655	429, 217	389, 717	340, 326
B. CONTRACT HIRE PERSONNEL <sup>b</sup>					
1956					
June 30.....	291, 062		185, 392	21, 241	84, 429
Dec. 31.....	273, 528		172, 818	21, 654	79, 056
1957					
Jan. 31.....	273, 044		172, 486	21, 640	78, 918
Feb. 28.....	272, 516		172, 227	21, 645	78, 644
Mar. 31.....	271, 349		172, 194	21, 406	77, 749
Apr. 30.....	270, 219		171, 205	21, 469	77, 545
May 31.....	269, 766		171, 558	21, 252	76, 956
June 30.....	267, 894		170, 377	21, 258	76, 259

<sup>a</sup> Total paid employees (full-time, part-time, and intermittent) as reported officially to the Civil Service Commission. Includes employment charged to the Military Assistance Program and to Civil Functions.

<sup>b</sup> Foreign nationals supporting the armed forces in certain overseas areas under contracts or agreements with foreign governments.

TABLE 11. CIVILIAN EMPLOYEES AND ASSIGNED MILITARY PERSONNEL, OFFICE OF THE SECRETARY OF DEFENSE, FISCAL YEAR 1957

	1956						1957									
	June 30		Dec. 31		Jan. 31		Feb. 28		Mar. 31		Apr. 30		May 31		June 30	
	Civilian	Military														
Secretary of Defense Activities:																
Office of the Secretary and Deputy Secretary.....	53	49	46	44	46	45	46	45	45	46	43	46	45	48	44	46
Assistant to the Secretary (Atomic Energy).....	13	19	14	19	15	19	13	19	13	19	13	19	13	19	13	19
Assistant to the Secretary (Legislative Affairs).....	6	5	6	6	6	6	7	6	9	5	9	5	9	4	9	4
Assistant to the Secretary (Special Operations).....	15	5	14	5	14	5	14	5	12	5	12	5	13	5	12	7
Assistant to the Secretary (Guided Missiles).....	5	6	13	6	13	6	14	6	13	6	13	5	13	5	13	4
General Counsel.....	70	67	67	68	68	68	66	66	67	67	68	68	64	64	61	61
Assistant Secretary (Public Affairs).....	64	47	64	48	65	48	64	47	64	49	65	49	66	49	63	48
Assistant Secretary (International Security Affairs) <sup>a</sup> .....	194	88	207	96	207	94	208	94	207	93	204	93	202	92	205	85
Joint Chiefs of Staff.....	177	312	181	312	181	309	180	309	177	310	176	311	175	315	178	317
Assistant Secretary (Comptroller).....	142	6	137	3	141	3	143	3	146	3	148	3	149	3	148	4
Assistant Secretary (Manpower, Personnel, and Reserve).....	254	71	219	71	218	72	218	72	220	73	223	69	223	71	223	72
Assistant Secretary (Supply and Logistics) <sup>b</sup> .....	492	25	259	17	259	17	260	17	260	16	257	16	255	15	260	12
Assistant Secretary (Properties and Installations).....	73	75	75	1	75	1	74	1	74	1	74	1	72	1	73	1
Assistant Secretary (Health and Medical).....	11	9	12	9	11	11	11	10	11	10	11	11	11	11	11	11
Assistant Secretary (Research and Engineering).....	192	63	198	68	200	67	198	65	194	66	197	66	191	63	184	62
Special Programs.....	5	3	15	3	15	3	14	3	12	3	11	3	11	3	14	4
TOTAL, SECRETARY OF DEFENSE ACTIVITIES.....	1,766	708	1,527	707	1,534	706	1,530	702	1,524	705	1,519	701	1,512	704	1,511	695
Other Activities:																
United States Portion of the Standing Group, NATO.....	36	71	37	72	36	70	37	69	38	71	37	70	38	69	37	70
United States Court of Military Appeals.....	37	42	42	41	41	40	40	40	40	40	40	40	39	39	39	39
Interdepartmental Activities.....	2	17	17	7	16	7	16	7	15	7	15	7	14	7	13	8

APPENDIX

TOTAL, FULL-TIME EMPLOYEES.....	1,841	779	1,623	786	1,627	783	1,623	778	1,617	783	1,611	778	1,603	780	1,600	773
Intermittent Employees.....	58		67		53		44		55		47		52		55	
TOTAL EMPLOYEES.....	1,899	779	1,690	786	1,680	783	1,667	778	1,672	783	1,658	778	1,655	780	1,655	773

<sup>a</sup> Includes personnel of the Office of Defense Advisor, USRO.

<sup>b</sup> Data for June 30, 1956, include personnel of the Cataloging Division which was transferred to the Department of the Air Force effective July 30, 1956.

Table 1. Summary of the results of the analysis of variance for the different parameters of the soil.

Parameter	Source of Variation	F	df	Significance
pH	Treatment	1.2	2	ns
	Block	0.5	1	ns
	Error	0.1	18	ns
EC	Treatment	1.5	2	ns
	Block	0.8	1	ns
	Error	0.2	18	ns
C <sub>org</sub>	Treatment	3.5	2	**
	Block	1.2	1	ns
	Error	0.5	18	ns
C <sub>tot</sub>	Treatment	4.2	2	**
	Block	1.5	1	ns
	Error	0.6	18	ns
N <sub>tot</sub>	Treatment	2.8	2	**
	Block	1.0	1	ns
	Error	0.4	18	ns
P <sub>tot</sub>	Treatment	1.8	2	ns
	Block	0.9	1	ns
	Error	0.3	18	ns
K <sub>ex</sub>	Treatment	2.5	2	**
	Block	1.1	1	ns
	Error	0.4	18	ns

ns = not significant, \*\* = significant at the 1% level.

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