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CLOSE AIR SUPPORT

REPORT

OF

THE SPECIAL SUBCOMMITTEE ON CLOSE AIR SUPPORT

OF THE

PREPAREDNESS INVESTIGATING SUBCOMMITTEE

OF THE

COMMITTEE ON ARMED SERVICES UNITED STATES SENATE



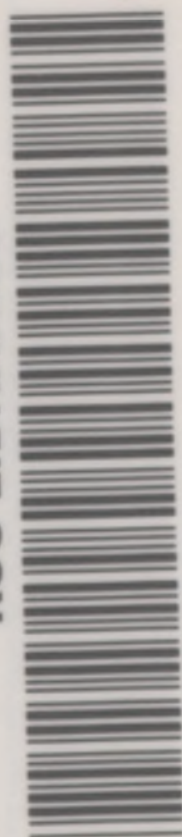
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LETTER OF TRANSMITTAL

COMMITTEE ON ARMED SERVICES,
SENATE PREPAREDNESS INVESTIGATING SUBCOMMITTEE,
SPECIAL CLOSE AIR SUPPORT SUBCOMMITTEE,
Washington, D.C., April 18, 1972.

Hon. JOHN C. STENNIS,
Chairman, Committee on Armed Services,
U.S. Senate, Washington, D.C.

MY DEAR MR. CHAIRMAN: There is transmitted herewith a report by the Special Close Air Support Subcommittee of the Preparedness Investigating Subcommittee which was appointed by your letter of March 1, 1971.

After a careful and detailed staff study and investigation, the Subcommittee held extensive hearings on this matter commencing October 22, 1971, and terminating November 8, 1971. The declassified transcript of the hearing has been printed and released publicly.

The subcommittee has inquired exhaustively into all matters specified in your letter and has given complete and careful consideration to all pertinent issues involved in the thorny close air support problem. Our views on these matters, and our findings and recommendations with respect to them, are set forth in detail in the report transmitted herewith.

Attached to the report are additional views submitted by four of the nine members of the Subcommittee. These views highlight the wide diversity of opinions which the subject of close air support can evoke from any body of reviewers. I believe that these additional views are representative of the various approaches to close air support to which the subcommittee was exposed during the course of our investigation.

It is my hope that a reading of the body of this report, along with consideration of the additional views, will contribute to a better understanding of the subject of close air support and the issues which it involves.

Very respectfully,

HOWARD W. CANNON,
Chairman, Special Close Air Support Subcommittee.

(III)

STATE OF CALIFORNIA

County of _____

Subscribed and sworn to before me this _____ day of _____, 19____.

Notary Public for the State of California

My Commission Expires _____

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BACKGROUND OF THE SUBCOMMITTEE'S REVIEW

Close air support as a military mission has received increased attention in recent years. This interest has been engendered in part by the experiences of the Vietnam war, where close air support was used to a considerable extent to repulse guerrilla attacks and ambushes and as an important element of firepower in the pitched battles which were fought in that war. More recently attention has been drawn to close air support because of the development of the Air Force's A-X fixed wing jet divebomber and the Army's Cheyenne helicopter gunship, and the procurement of the Marines' Harrier V/STOL attack bomber. All of these aircraft are to be used in the close air support role.

Questions have been raised as to whether these 3 aircraft duplicate each other since ostensibly they are used for the same function, "close air support." Some contend that 1 or more of the 3 could be eliminated to prevent duplication of effort and to reduce defense costs. The House Appropriations Committee report on the Fiscal Year 1971 Defense Appropriations Bill (the report was dated October 6, 1970) specifically requested the Defense Department to review this issue which had been raised regarding these 3 aircraft and to submit their findings in time for the Fiscal Year 1972 budget review by the Congress.

This Defense Department study had not been completed when the FY 1972 budget was sent to the Congress. On March 9, 1971, Senator John C. Stennis, chairman, announced that he was forming a special subcommittee of the Preparedness Investigating Subcommittee of the Senate Armed Services Committee to make a complete survey of the close air support program. This subcommittee is composed primarily of members of the Preparedness Investigating Subcommittee, with Senator Howard W. Cannon (D-Nev.) acting as chairman. Other members are Senators Stuart Symington (D-Mo.), Tom McIntyre (D-N.H.), Harry Byrd (I.-Va.), Harold Hughes (D-Iowa), Strom Thurmond (R-S.C.), John Tower (R-Tex.), Barry Goldwater (R-Ariz.), and Peter Dominick (R-Colo.). Senator Stennis' announcement stressed that the total close air support program would be examined as well as the specific hardware issues such as A-X and Cheyenne. The subcommittee's review, in order to be as comprehensive as possible, was not scheduled to be completed before the FY 1972 Defense Authorization Bill was reported to the Senate, but it was intended that the subcommittee complete its study in time to submit this report before the FY 1973 authorization bill was considered.

SCOPE OF THE SUBCOMMITTEE HEARINGS

The hearings of the subcommittee were preceded by several months of investigation and preparation by the staff of the Preparedness Investigating Subcommittee.

Hearings on close air support commenced on October 22 and ended on November 8, 1971. Hearings were held on 7 separate days. Testimony was heard from Deputy Secretary of Defense David Packard and the Chairman of the Joint Chiefs of Staff, Admiral Thomas Moorer, on the overall problems of close air support and on the Defense Department's study report on that subject; from representatives of the Defense Intelligence Agency on the extent and nature of potential enemy air defenses against close air support aircraft; and from representatives of the Army, Air Force, Marines, and Navy regarding close air support and the weapon systems used for that mission. In addition, Senator William Proxmire (D-Wisc.), at his own request, testified regarding the views of the Members of Congress for Peace through Law on close air support hardware. The complete record of the testimony, except for information deleted because of security classification at the request of the Department of Defense, is contained in 1 volume covering 484 pages. In all, a total of 21 witnesses testified during the course of the hearings.

SYNOPSIS OF THE REPORT

The report first reviews the Defense Department's report on close air support, including its admitted limitations. Next a general overview is given of the mission of close air support, including the viewpoints of the ground soldier regarding the land battle and the airman regarding the tactical air war. Next, other, more general, aspects of close support are summarized, including enemy anti-aircraft defenses, the types of aircraft currently used for close air support, the types of munitions used, the areas of desired improvements, and a look at computer-aided bombing systems. A summary is presented of the roles and missions question, with a review of the assigned missions of the four services and a look at the controversy between the Air Force and Army over close support with fixed wing aircraft and armed helicopters. The command and control system used for close air support is synopsized. Then a brief review is presented of the new hardware programs, the A-X, Harrier, and Cheyenne, plus the alternative helicopters, Blackhawk and King Cobra.

The findings and recommendations, in brief, are the following. Close air support as provided to the ground soldier in past conflicts has been well executed, but the subcommittee recommends that programs to improve close air support should be pursued. The command and control system is viewed as fundamentally sound. In the roles and missions area, the subcommittee believes that the Department of Defense should redefine and assign the roles and missions of close air support, because the many interservice agreements and the advances in helicopter capability in the past twenty-four years have left the original assignment ambiguous and unclear, resulting in unproductive interservice rivalry. The subcommittee supports the A-X prototyping program, but recommends that these prototypes have an operational fly-off with the existing A-7D and A-4M so that recommendations can be made for the future force structure of these airplanes and that additional A-7Ds be procured until this question is resolved. The subcommittee regards the Harrier as an operational experiment with V/STOL technology and recommends that no additional aircraft

beyond the 60 already ordered be procured. Finally, the subcommittee finds a valid requirement for a more capable attack helicopter, provided the questions regarding helicopter vulnerability are resolved successfully.

THE DEPARTMENT OF DEFENSE STUDY REPORT

The Defense Department's report on close air support and on the A-X, Cheyenne, and Harrier, responding to the previously mentioned House Appropriations Committee mandate, was forwarded to the Senate and House Armed Services and Appropriations Committees on June 22, 1971. Deputy Secretary Packard's covering letter also enclosed the 7-page summary and conclusions section. Some critics of the Department's study and report mistakenly stated that this 7-page summary section comprised the whole report, apparently unaware that a 143-page report also had been written giving the details and supporting documentation of the DOD review.

RECOMMENDATIONS OF THE REPORT

The Packard report (as it will be commonly referred to in this report) recommended continuing the development program on the A-X and the Cheyenne and continuing the limited procurement program of the Harrier (which is a total planned buy of 114 aircraft through FY 1974). These recommendations in essence—and not surprisingly—supported the fiscal year 1972 budget recommendations which already had been submitted to the Congress in February.

The report went beyond a mere endorsement of the status quo, however, and pointed out that certain questions about each aircraft's capabilities had been raised which needed to be answered before large procurement orders would be placed for any of the aircraft. These questions included the vulnerability of the A-X to anti-aircraft fire, the vulnerability to ground fire and the target acquisition capability of attack helicopters, and the sortie rate capability of the Harrier from forward austere bases. The report further stated that operational testing would be performed to investigate these questions that had been raised about each of the aircraft.

Deputy Secretary Packard affirmed the Department's commitment to these operational evaluations when testifying before the subcommittee. Since the tests would not be performed until Calendar Year 1972, he stated that procurement of the A-X or the Cheyenne could not be placed and would not be requested before Fiscal Year 1974.

SCOPE AND LIMITATIONS OF THE REPORT

The Packard study examined the needs for close air support by war-gaming several scenarios of possible conflicts of the near future. It also examined in some detail the characteristics of the present close air support systems, potential improvements that could be made to the present systems, and finally the new close air support aircraft, the A-X, Cheyenne, and Harrier. The costs of all of these systems were estimated for 10-year life-cycles. Then these new close air support aircraft were compared with the current tactical airplanes on a

cost-effectiveness basis using systems analysis techniques. These cost-effectiveness studies brought out the questions about critical characteristics of the new aircraft such as A-X relative vulnerability, Cheyenne target acquisition, and Harrier sortie rates.

There were admitted limitations to the study. Its primary defect was that, in common with all computerized systems analyses, the simulation of the battle had to be grossly over-simplified from a real-world situation. The Departmental witnesses readily confirmed that limitations existed in the report. The simulations basically were one-on-one studies; that is, they pictured one airplane attacking one tank defended by one anti-aircraft gun. Systems analysis is unable to cope with all of the myriad complexities of the battlefield.

Omitted were the effects of enemy fighter aircraft, suppression of enemy air defenses, SAM missiles, tactical electronic counter-measures, and the fact that many aircraft will be making multiple passes at a host of enemy targets, while flying through a barrage of anti-aircraft fire. Nevertheless the analyses did serve to highlight critical issues, even though specific results such as the details of numbers of targets destroyed or of attacking aircraft lost, admittedly were not necessarily correct values for real-world battles.

SCHEDULE FOR CONTINUING STUDIES

Deputy Secretary Packard revealed that the close air support study would be continued by OSD and would next review command and control procedures and logistics requirements. These reviews were scheduled to take on the order of 5 months and presumably will be completed by April, 1972. He stated further that any review by the Department of the roles and missions question, that is, which service should operate close air support aircraft, would not take place until these other studies were completed.

CLOSE AIR SUPPORT, THE LAND BATTLE, AND THE TACTICAL AIR WAR

DEFINITION AND DESCRIPTION OF CLOSE AIR SUPPORT

Close air support is defined in the Joint Chiefs of Staff's Dictionary of U.S. Military Terms, as follows:

"Air attacks against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces."

All of the Defense Department witnesses before the subcommittee subscribed to this basic definition. There are two distinguishing characteristics of close air support, implied by the above definition, that differentiate it from other air attacks of ground targets. These are the close proximity of the targets to friendly troops and the resulting requirement for integration of each air strike with the fire and movement of those troops. This infers a need for careful identification of each target and precise delivery of ordnance on all targets so as not to injure one's own forces. It further infers a requirement for ground control and coordination of the air strikes so the aircraft is not struck by friendly artillery, mortars, or small arms fire while it is delivering ordnance. In actual practice, each and every aircraft bombing run in close air support is under the positive control of a Forward Air Controller (or FAC), who may be on the ground or airborne and who gives the attacking pilot permission to fire or drop on each attack run when the targets are in close to his own troops.

To fall within this definition, close support air attacks will be located in the immediate battle area, from the line of contact back to the edge of friendly artillery range. The types of targets will vary from "soft" targets such as troops and lightly armored vehicles that are susceptible to strafing fire from machine guns and rockets to "hard" targets such as tanks, bunkers, and other fortifications that require heavier types of ordnance.

THE LAND BATTLE: ARMY AND MARINE VIEWS OF FIREPOWER AND CLOSE AIR SUPPORT

The Army and Marines view close air support as an extension of the total firepower involved in ground warfare. It is an integral part of the overall land battle.

The spectrum of firepower used in the land battle ranges from hand-held weapons and machine guns upwards through mortars and recoilless rifles, light and heavy artillery, tank armament, surface-to-surface guided missiles, and close air support delivered ordnance.

An important characteristic of firepower is that it contains overlapping elements, which are at the same time mutually supporting. The Army in particular stresses this argument very strongly.

The infantryman is the essential unit of warfare. Only a ground soldier can occupy and hold territory, and wars almost invariably have

been won in that manner. The infantryman uses his rifle, machine gun, or grenade launcher, and other hand-held weapons as his basic element of firepower. He is supported by mortar fire from mortar squads. When heavier firepower is needed, artillery units organic to his battalions or division deliver that fire. Armored units provide mobility, armor protection and increased firepower. And finally, aircraft provide still more firepower, either from the sustained strafing fires of armed helicopters or the heavier ordnance dropped or fired from fixed wing airplanes.

In a sense all of these fires are overlapping and duplicative. All of them have the same basic objective, to help the infantryman occupy and hold ground. Most probably any one of the weapons that contributes to firepower could be eliminated—if there was a desire to do so to eliminate “duplication”—without totally compromising the infantryman’s ability to wage war. Yet any such reduction in the overall firepower used in the land battle invariably would exact a cost in lives and have a concomitant reduction in the effectiveness of the soldier to carry out his mission.

Close air support, then is an extension of firepower in the view of the ground soldier. It is an element of the land battle. The testimony before the subcommittee, from Army and Marine soldiers experienced in combat, indicated that it is an essential element of their firepower.

THE TACTICAL AIR WAR: AIR FORCE AND NAVY VIEWS

The Air Force and the Navy have an overall air mission to prosecute the tactical air war. To both of these services, close air support is but one part of this tactical air war. The Air Force is charged with the primary responsibility to provide close air support for the Army (while the Marines have primary responsibility to provide their own close air support). The Navy has a secondary mission in providing close air support for the Marines and the Army. It is secondary only in the sense that their primary assignment and responsibility is tactical air operations involved with the war at sea.

There are four basic missions associated with the tactical air war. These are air superiority, interdiction, reconnaissance, and close air support. All four of these missions must be considered by force planners as they apportion their budgets allocated to tactical airpower. In a sense, then, these four missions compete with one another in priority for the funds available. The problem of satisfying these priorities when funds are limited tends to lead to multi-purpose as opposed to single purpose aircraft.

The air superiority mission has first priority in the tactical air war. All services agree that the first order of business is to defeat the enemy’s airpower and remove his capability to deliver air attacks on friendly forces. Reconnaissance always is a vital need also, and therefore has a high priority. Reconnaissance aircraft, however, generally are single purpose airplanes.

The relative priority of interdiction (attacking the enemy’s supplies, equipment, personnel, and lines of communications behind the battle area) versus the priority of close air support varies with the immediate tactical situation. A simple example could be drawn. It is more desirable to perform effective interdiction and destroy an enemy tank (with an interdiction mission) as it is moving towards the front.

However, once that tank is in a position to start firing at one's own troops, then killing it will have priority over attacking other tanks behind the lines that are not an immediate threat. Thus the relative operational priority between interdiction and close air support varies with the immediate tactical situation.

Both close air support and interdiction are air-to-ground attack missions. The major differences between them are in the operational environment in which they are carried out. Close support, by the JCS definition, takes place "in close proximity to friendly forces" very near to friendly territory, and must be integrated with the fire and maneuver of those forces. Interdiction attacks can take place anywhere from just beyond the forward battle area up to hundreds of miles behind the lines. Interdiction may have different mission requirements from close support regarding penetration and survivability. An airplane designed for deep penetration into enemy territory may need greatly different characteristics from one designed for operation over or near friendly areas.

Whether a close air support airplane should have different design characteristics from an interdiction airplane or whether multi-mission planes should be used for both missions is one of the central questions to the current "duplication" of new close support systems. In particular, the Air Force's A-X and the Marines' Harrier represent two different philosophical approaches to this question. This subject is discussed further later in this report.

OTHER ASPECTS OF CLOSE AIR SUPPORT

THE THREAT: ENEMY AIR DEFENSES

The Soviet anti-aircraft defenses for their Army units in the NATO-Central European area will consist of barrage fires from light hand-held weapons in the 7.62 mm range and machine guns up to 12.7 mm (the equivalent of our .50 caliber), heavy anti-aircraft fire from 23 mm and 57 mm guns, and various SAM missile defenses. One of the most potent threats is the Soviet Quad-23, a self-propelled 23 mm gun with 4 barrels mounted on a tank chassis and with radar fire control. The war-gaming in the Defense Department's study report assumed this would be the primary threat and played one-on-one simulations of one tank defended by one Quad-23 and attacked by one aircraft.

At night the quantity of the threat diminishes since non-radar guided (i.e., visually aimed) weapons are relatively ineffective. On the other hand the capability of current aircraft to deliver close air support at night is degraded significantly because most close air support weapons are aimed visually, too. Testimony before the subcommittee revealed that improved night visual capabilities are possible with systems currently being tested on the A-7 airplanes.

The light weapons will produce barrage fires up to 3,000 to 4,000 foot altitudes. The Quad-23 has approximately a 10,000 foot range, and the 57 mm has considerably longer range. The SAM missiles outrange the guns by a wide margin.

Soviet doctrine is to attack at night, around the clock, and in any kind of weather. In Europe, weather in the summer months is usually quite good, and close air support aircraft will be able to counter the anti-aircraft weapons by firing stand-off air-to-ground missiles such as the Maverick or Bulldog, or by releasing their bombs at long slant ranges. In the winter months in Europe, the weather conditions are much worse for operating fixed wing aircraft, and low ceilings and restricted visibility are common. In the worst month, December, ceilings are lower than 3,000 feet for over two-thirds of the time, which indicates that it will be difficult for fixed wing aircraft to provide close air support without flying down into the heaviest threat area. This problem is not unique to a European scenario, of course. Most areas of potential conflict present similar weather problems during at least a part of the year. In the worst weather conditions, attack helicopters will have to provide the bulk of the close air support firepower.

AIRCRAFT USED IN CLOSE AIR SUPPORT

A list of currently operational aircraft used for close air support, supplied by the Defense Department, is as follows, along with the current investment cost* of these aircraft as given in the Packard report:

*Investment cost includes aircraft cost plus support equipment and initial spares.

Air Force:	<i>Million</i>
F-4C/D/E, Phantom (fixed wing)-----	\$3. 8
A-7D, Corsair II (fixed wing)-----	3. 2
Marines:	
A-4M, Skyhawk (fixed wing)-----	2. 0
A-6A, Intruder (fixed wing)-----	5. 4
F-4B, Phantom (fixed wing)-----	
AH-1J, Sea Cobra (helicopter)-----	1. 1
Navy:	
A-4E/F, Skyhawk (fixed wing)-----	1. 5
A-6A, Intruder (fixed wing)-----	5. 4
A-7A/B/E, Corsair II (fixed wing)-----	3. 3
F-4J, Phantom (fixed wing)-----	4. 6
Army:	
UH-1C, Huey (helicopter)-----	. 4
AH-1G, Cobra (helicopter)-----	. 5

The significant point about this list is that it includes *every* tactical fighter or attack aircraft in the inventory except for the Air Force's F-111 night and all-weather interdiction bomber. The point was made by the senior representatives of each service during their testimony that all combat tactical aircraft can and do contribute to the total close support capacity available, when they are not required for higher priority tactical air war missions. The list shows that there are 4 different fixed wing aircraft, in a total of 13 versions, and 2 armed helicopters in 3 versions, that are used for close support.

Historically, in past wars, close air support missions have taken a minority of the tactical air missions. In the World War II European campaign, close support accounted for but 15 percent of the total missions. Yet when a surge of ground fighting occurs, as when an enemy force masses for an attack, all available tactical air assets may be used in the close support role. The flexibility of tactical aircraft allows for this augmentation of available close air support resources when it is required.

CLOSE AIR SUPPORT MUNITIONS

The munitions used in close support fall in three principal categories, strafing munitions, free-fall ordnance, and air-to-ground guided weapons. Attack helicopters primarily use strafing weapons, i.e., machine guns or cannon and unguided rockets, although they also will be equipped with guided rockets such as the present TOW and proposed Hellfire missiles for anti-armor attacks. Helicopters are not capable of carrying and do not carry the heavier free-fall munitions.

Fixed wing aircraft carry all three types of munitions. Current tactical aircraft typically are armed with 20 mm cannon, which are excellent for strafing of personnel and vehicles but do not have a tank killing capability. The Harrier is equipped with a 30 mm gun which has a kill capability against lightly armored vehicles but not against tanks. A heavy 30 mm gun is being developed for the A-X which is designed to defeat heavy armor, including tanks.

Fixed wing aircraft carry the full spectrum of free-fall bombs, cluster munitions, napalm, etc. In addition, a new class of guided and rocket-powered weapons is being developed to give longer stand-off delivery ranges than available with the free-fall bombs. These weapons such as Maverick and Bulldog, use electro-optical (TV) or laser guidance for accurate terminal bombing. The testimony given indicated that these weapons will be needed as enemy air defenses increase in intensity.

DESIRED IMPROVEMENTS

The Packard report listed six deficiencies in present close air support capabilities, as follows: (1) Much of the inventory would be assigned to tasks other than close air support, particularly in NATO-Central Europe. (2) Many current aircraft/weapon combinations do not possess adequate delivery accuracy against close air support targets. (3) Present and future enemy air defense systems constitute an unparalleled threat to all close air support aircraft. (4) Acquisition of small tactical targets is not adequate especially when enemy air defenses preclude extended search times. (5) Response times are too long for immediate (as opposed to pre-planned) missions. (6) Requirements for large fixed bases increases vulnerability, decrease flexibility (e.g., in amphibious operations) and reduce responsiveness and sortie rates. The report stated that improvements were needed in the areas of aircraft, ordnance, target acquisition systems, and command and control.

Testimony from witnesses giving the viewpoint of the ground soldier indicated that the ground commander's primary desires for close air support are for responsiveness and accuracy. He wants the close air support to appear rapidly after he calls for it, and he wants the ordnance delivered on the target that is threatening him. The testimony showed that over-all average response times in Vietnam for close air support were approximately 20 minutes for attack helicopters and 30 minutes for fixed wing aircraft.

The A-X and Harrier represent two different approaches to improving effectiveness of fixed wing close air support. The A-X design concept emphasizes capability for long airborne loiter periods near the front lines while awaiting a request for close air support. The Harrier concept is to ground loiter at roughly prepared forward sites near the front lines while awaiting a request, using the VTOL capability to land and take off from the site. Hopefully, both approaches will yield improved responsiveness.

Improved delivery accuracy can be obtained from the use of terminally guided missiles and from improved bombing systems for free-fall bombs. The development of the Maverick and Bulldog missiles, already mentioned, will provide both better accuracy and longer stand-off range.

COMPUTER AIDED BOMBING SYSTEMS

Special mention must be made of the already demonstrated improvement in bombing accuracy obtained with the weapons delivery system in the Air Force A-7D and Navy A-7E. This bombing system has produced approximately a factor of three improvement in accuracy over the so-called "fixed sight" systems used in most other dive bombing aircraft, and approximately double the accuracy of the analog computer dive-toss systems used in the F-4, A-4, and A-7A/B.

The bombing system itself is a relatively complex grouping of avionics equipment. The main components are an inertial navigation platform, a digital computer, a radar set, and a "heads-up display" pilot's sight. Development problems still have not been completely resolved, particularly with the reliability of the radar set.

The bombing accuracy improvement results primarily because the digital computer can calculate continuously the precise bomb release

point and automatically drop the bombs at the right time, accounting for the ballistic trajectory of whatever weapon is being dropped, the maneuvers the airplane is flying, and also including the effects of whatever wind is blowing. This frees the pilot from flying a fixed dive-bombing run with a pre-determined dive angle, speed, and release altitude as must be done with a fixed sight or analog system. It also permits the pilot to perform "jinking" evasive maneuvers up to the time of bomb release if he is under anti-aircraft fire. This capability for evasive maneuvering plus unrestricted attack profiles has generated considerable enthusiasm from A-7D and E pilots. Navy combat results with the A-7E in Southeast Asia in particular have been most impressive. The A-7E has been allowed to drop much closer to friendly troops than other aircraft in close air support and also has compiled an excellent record in interdiction missions.

The A-7D and E basically are daylight-visual ground attack aircraft, although some prototype night-visual systems are being developed. Considering their primary mission as visual attack of ground targets, they are admittedly the best aircraft for the close air support role in the United States inventory today.

ROLES AND MISSIONS

The issue of which service should have the role and mission of providing close air support has caused considerable interservice rivalry over the years. This rivalry continues today between the Air Force and Army, particularly as it concerns the question of the use of attack helicopters. The subcommittee inquired in great depth into the history and present status of this issue in an effort to understand how it affects the present controversies over the A-X, Cheyenne, and Harrier, and over duplication of close air support resources.

HISTORICAL REVIEW OF ROLES AND MISSIONS ISSUES

A major element of the roles and missions controversy stems from a debate over centralized versus decentralized control of tactical air assets in a theater of operations. The Air Force in particular is a strong proponent of centralized control of airpower.

Prior to the North African campaign in World War II, Army Air Corps units were attached to equivalent Army ground units and in essence were organic thereto. After several defeats in Africa by the Germans, who were concentrating their total air power available and overwhelming the individual Army units, General Eisenhower reorganized the United States' airpower under theater-wide control, and this concept of centralized control was used with success throughout the remainder of the war.

The Air Force was designated as a separate service by the National Security Act of 1947. This Act stated that the Army "includes land combat and service forces and such aviation and water transport as may be organic therein." It defined the Air Force as including "aviation forces both combat and service not otherwise assigned."

In order to prevent duplication and overlap of effort, the Key West Agreement of 1948 (later issued as DOD Directive 5100.1) expanded on the roles and missions assigned to each service. This agreement specifically gave the Air Force responsibility to provide close combat air support for the Army. This mission assignment has remained unchanged since that time, and the Air Force still exercises centralized control of its own aircraft.

There have been various supplementary agreements on this roles and missions issue since that time. In 1952, a memorandum of understanding between Army Secretary Pace and Air Force Secretary Finletter specifically stated that Army aircraft will not duplicate the functions of the U.S. Air Force in providing close combat support, and further defined Army organic aircraft as ones primarily utilized within the Army combat zone, 50 to 100 miles in depth. A 1956 Secretary of Defense memorandum to clarify roles and missions reaffirmed the Key West agreement and stated that Army aviation will not provide close combat air support. Defense Department Directive

5160.22 of March, 1957 also denied the Army aviation program the mission of close air support. (This directive was cancelled in 1971.)

In 1966, however, the Johnson-McConnell agreement between the Chiefs of Staff of the two services stated that the Air Force "would relinquish all claims for helicopter and follow-on rotary wing aircraft—for intra-theater movement, *fire support*, supply—." (Emphasis added.) The Cheyenne attack helicopter program was started at this time. This agreement was the first to specify that the Army had jurisdiction to operate armed helicopters. It should be noted, however, that this agreement still conforms to earlier provisos in that the Army attack helicopters are operated organic to Army ground or air-mobile units, division size or smaller. Also, helicopters operate primarily within the Army combat zone, as it was defined in the Pace-Finletter agreement in 1952.

Then in March, 1970, at the height of the controversy which developed over whether the A-X and the Cheyenne were overlapping and duplicative, Air Force Secretary Seamans and Army Secretary Resor signed an agreement which greatly expanded the JCS definition of close air support. The mission was broken down into eight separate tasks, such as support of engaged troops, support of airborne/heliborne assaults, escort of aircraft/helicopters, etc., with the final task being "general support of the battlefield area." The Army and Air Force views regarding the suitability of their aircraft to perform the eight tasks were presented, along with a recommendation to continue development of both aircraft. The Army also supported the A-X program through procurement and deployment but the Air Force would support only prototype development of the Cheyenne. This agreement, which evolved a new definition of the mission but could not reach an agreed course of action for procurement of a force structure, is indicative of the extent of the inter-service rivalry over close air support.

EVOLUTION OF THE ARMED HELICOPTER

Helicopter technology did not advance to the point of providing truly useful aerial vehicles until the Korean War era of the early 1950's. In that conflict helicopters were used primarily as ambulances and as very limited lift vehicles. Subsequent to that war, helicopter payload capabilities increased to the point that airmobile operations with large numbers of troops became feasible. Helicopter airmobility as an Army function was recommended by the Howze Board in 1962, confirmed by operational testing with the 11th Air Assault Division in 1963-1964, and the Army in 1965 began a large buildup of its aviation assets. It soon was discovered in the Vietnam combat environment that helicopters were superior to fixed wing aircraft for providing light but sustained suppressive firepower in escort of other helicopters and in support of troop ships during landing operations. (Fixed wing aircraft still provided the heavier firepower.) The Cobra and its follow-on, the Cheyenne, evolved from this combat experience.

Thus, the Army's use of attack helicopters resulted from an evolutionary process similar to the one that the armed airplane passed through in World War I. The attack helicopter was an outgrowth of the combination of an existing capability (helicopter mobility), plus a need for firepower to support that capability. This need for firepower was based on combat experience. In this case, the attack helicopter grew out of the experience in the environment of the Vietnam war.

MARINES AND NAVY ROLES AND MISSIONS

The Marines are organized in a Division-Air Wing team, with one air wing essentially organic to each of the three Marine divisions. The Marines are responsible for providing their own close air support, and they have the authority to equip their air wings as they believe is best to accomplish this mission.

An interesting point about the composition of a Marine air wing is that it includes both fixed wing close air support airplanes and also attack helicopters. The Marines, who do not have an arbitrary division of roles and missions responsibilities, believe that both types of aircraft are necessary to support their ground units. Another interesting point about the composition of a Marine air wing is that quantitatively about one-third more Marine aircraft are available for close support of a Marine division than Air Force aircraft are available for close support of an Army division.

Testimony by both Marine aviators and ground soldiers also emphasized the benefits of having an air-ground team that worked together, trained together, and even included exchange duty to promote mutual understanding of the ground and air missions. The Marines believe that this close coordination leads to the best possible close air support delivered to the "customer," the soldier on the ground.

In addition, the Marines train more extensively in coordinated close air support exercises with the air wing and division operating together. Information provided to the subcommittee indicates that the Marine air wing squadrons operate directly in support of ground troops doing close air support training much more often than the Air Force and Army train together. Marine air wings are stationed in the same geographical area as the division which they will support, so it is easier for them to train together.

In summary, Marine close air support emphasizes quantity, it emphasizes close coordination and training, and it also utilizes both fixed wing aircraft and helicopter gunships when this close air support is provided. The helicopter gunships are primarily used operating as escorts for other helicopters.

The Navy has a collateral responsibility to provide close air support for Marine and Army units ashore when carrier-based aviation is in a position to deliver such support. There is no duplication or overlap in the roles and missions of Marine and Navy tactical air power. Both add to the total tactical air resources of the Navy. Marine squadrons are carrier qualified and at times are used to supplement Navy carrier airpower afloat when the Navy is short of required aircraft. Likewise, Navy squadrons support the Marines during amphibious landings and as long after the landing as additional air support is needed. Thus, Marine air and Navy air are complementary, not duplicative.

SUMMARY OF ROLES AND MISSIONS CONTROVERSY

The Air Force was assigned the role and mission of providing close air support for the Army as early as 1948. This assignment is in a written Department of Defense directive and is unambiguous.

Although all of the historical documents relating to the Air Force and Army roles and missions have confirmed that the Air Force has

the mission to provide close air support for the Army, most of these documents were written before the advent of the helicopter as an integral part of the Army's organization. The Army's precedent for arming and operating helicopter gunships, in the sense of having a written authority, stems from the allowances to operate its own organic aviation and from the Johnson-McConnell agreement of 1966. In addition, each Army attack helicopter procurement program (the armed Huey, the Cobra, and the Cheyenne) has been approved by the Defense Department and funded by the Congress. These have established de facto recognition of the Army's function. Nevertheless, the Army's authority does appear ambiguous because of an apparent conflict with the Air Force's assigned mission, which also has historical precedent over this new Army function.

Testimony by the Air Force indicated that that service opposed development of an advanced helicopter gunship because the Air Force feared that their traditional mission assignment of providing close air support for the Army was being impinged upon. The Air Force further questioned the ability of the attack helicopter to live in a high intensity combat environment.

The testimony given before the subcommittee also made it apparent that there is a difference in organizational concept between how fixed wing aircraft and helicopters are operated. This difference results in large part from the difference in performance capability of the two types of aircraft. Fixed wing airplanes have high speed and long range, relative to helicopters, and it is natural to base them in central locations well behind the battle lines and to exercise centralized control over them so their firepower can be massed when and where needed. This represents economy of force, a basic principle of warfare.

Helicopter gunships lack this speed and longer range mobility. They operate in the same flight regime as helicopter troop ships which they support, they can use the same bases and logistic support, and, therefore, they naturally fit organizationally with Army helicopter-equipped units. Decentralized control of attack helicopters seems as logical as centralized control of fixed wing aircraft.

In summary, it would appear that the two primary contributing factors to interservice rivalry over the roles and missions of close air support are semantic and organizational. The battlefield firepower contributed by armed helicopters is distinctly different from the firepower provided by fixed wing aircraft, so calling both "close air support" may be in error in that it adds to this controversy. On the other hand, an argument between advocates of centralized and decentralized control of airpower does not appear a valid issue for debate when referring to fixed wing aircraft on the one hand and helicopters on the other. It appears that there is a place for both fixed wing and attack helicopters on the battlefield, and that interservice rivalry over this issue is counterproductive to the goal of providing the best possible firepower support for the soldier on the battlefield.

COMMAND AND CONTROL

The system used by the Air Force-Army and by the Marines-Navy for command and control of close air support strikes essentially is identical. Liaison between the ground units and the air units is performed at the lowest, or operational, level between the forward air controller, who is an aviator, and the company commander of the ground unit. Their requests for close air support are forwarded upwards via battalion, brigade, division, and corps headquarters, with air and ground liaison at each level.

In the case of pre-planned missions, ones that are scheduled a day in advance to support planned ground offensives, each monitoring level must approve the requests and set relative priorities of the missions. Assignments of aircraft to fulfill the mission requests are made at the division-air wing level with the Marines' system and at the theater level with the Army-Air Force system.

For immediate requests for close air support, those which occur due to unplanned contact with the enemy, the system is simplified and the request goes directly from the forward air controller to the aircraft allocation authority. This is the Direct Air Support Center (DASC) located at the Marine division level and at Army corps level. If the corps level DASC does not have aircraft available to respond, the request will be passed up to the theater-wide tactical air control center.

The Marine system is the same as the Air Force-Army system except that the Marines operate with an air wing organic to a division rather than having theater-wide control. When joint operations are being conducted with both Army and Marine units, however, the Marine command and control system can be integrated into the Army-Air Force system. This has been done successfully in Korea and in South Vietnam. The way it usually functions is Marine air still are targeted to support the Marine division with pre-planned close air support, but any unused assets are available to the theater. Similarly, unfulfilled requests are passed up to the centralized theater-wide control center. The two command and control nets are functionally compatible and effectively interchangeable. This use of common command and control is one of the great strengths of the close air support system. In effect, it amounts to a joint Department-wide doctrine for conducting close air support.

NEW CLOSE AIR SUPPORT HARDWARE SYSTEMS

THE FIXED WING AIRCRAFT, A-X AND HARRIER

The A-X and the Harrier represent two distinctly different approaches to improving close air support capability over present fixed wing aircraft. These differences are highlighted below, along with a brief summary of the status of both programs.

The A-X is being designed as a specialized single-purpose airplane for the close air support mission. Its top speed is low by modern jet airplane standards, being in the 400 to 450 knots range versus the 600-plus knots speed capability of swept wing attack aircraft such as the A-4M, the A-7, and the Harrier. The low top speed of the A-X is attributable to its straight wing design, a choice made over a swept wing in order to increase payload, cruise range, and air loiter capability, and to shorten takeoff and landing distance. This design choice results in approximately double the range/payload performance of the A-X over the Air Force's current close support airplane, the A-7D, according to present calculated performance estimates for the A-X. It also reduces takeoff and landing distances as compared with the A-7D.

The A-X design concept is to emphasize simplicity. A minimum of avionics equipment will be used, including a fixed sight bomb delivery system. A 30 mm gun with tank-killing capability is being developed to be a primary element of its armament. Use of this gun, if successfully developed, will require strafing attacks from relatively low altitudes, well within the lethal envelope of heavy anti-aircraft weapons such as the Quad-23.

The straight wing of the A-X also will enable it to fly more slowly than the swept jets and to make tighter turns at low speeds. This will allow the A-X to operate down under lower cloud ceilings and in poorer visibility, so it will be able to provide close air support in worse weather conditions than its higher speed counterparts. A moot question is whether this poor weather capability actually will be usable tactically, considering the expected level of enemy air defenses now and in the future against low-and-slow flying aircraft. The A-X design concept is to overcome this threat by armoring the airplane to survive being hit by anti-aircraft fire. The question of vulnerability and survivability was highlighted by the Packard report.

The A-X program presently is in a competitive prototype phase of development, with two contractors each building two prototypes under fixed price contracts. These aircraft are expected to fly in mid-1972 and are scheduled for an Air Force "fly-off" evaluation starting in October, 1972. The winner would then receive a contract to complete research and development, with options for initial production. Thus the A-X program is following the fly-before-buy concept and also is maintaining competition between contractors up through the preliminary flight test stage of the program.

There are several benefits that can be obtained from this novel approach to the A-X development program. The capabilities of the two competing aircraft to meet the Air Force's specified requirements will be assessed based on actually demonstrated flight performance. This will remove the uncertainties of evaluation based solely on paper design proposals and also will maintain the keen edge of competition until the hardware is built and tested. The Packard report showed the A-X investment cost as \$2.2 million per aircraft.

Another benefit inherent in the prototyping approach, and one which is most pertinent to the A-X program, is that the operational uncertainties of a new design concept can be tested and evaluated by the eventual users to ensure that those concepts do have the military utility that was envisaged for them. The validity of the A-X design concept of operating "low-and-slow" can be subjected to a thorough operational test and evaluation program with the prototypes before production is begun.

The Harrier represents an entirely different approach to improving responsiveness of close air support over the current generation of close support aircraft, the A-4M and A-7D/E. The Harrier retains the high speed swept wing of those airplanes and uses V/STOL technology to provide improved takeoff and landing performance. The Marine concept for providing better responsiveness is to use ground-loiter rather than airborne loiter, exploiting the vertical takeoff capability of the Harrier which is provided by engine thrust.

At the same time, the Harrier uses speed rather than armor to survive against anti-aircraft defenses. The Marines contend that the high speed performance also gives the Harrier a credible interdiction mission capability and even some air-to-air fighter capability. Thus the swept wing design philosophy essentially is a multi-mission approach to filling the tactical air requirements for close air support and interdiction, while using modern technology to improve close support responsiveness.

The testimony about the V/STOL capability of the Harrier indicates clearly that the mission performance—the range, payload, and combat time—is reduced severely when vertical takeoff and landings are used. The combat radius is only 50 miles with this VTOL mode of operation and combat time-on-station is very short. This raises questions about the utility of this mode of operation. When a conventional running takeoff is used, the Harrier's range and payload do not differ significantly from that of the A-4M, the Marines' present close support airplane.

Countering this apparent similarity with the A-4M, however, is the STOL or short takeoff and landing potential of the Harrier. In between the pure vertical lift-off and the conventional running takeoff, the Harrier has an infinite range of reduced takeoff runs it can use, with proportionately reduced ranges and payloads. This STOL capability permits a flexibility in basing which the Marines feel has great utility for their amphibious type of operations and for their shore-based combat. The A-4M does not permit this flexibility in basing.

Once basing flexibility is attained, then the ability to resupply the bases also must be available. A typical Harrier sortie can require 8,000 pounds of fuel and ordnance, so the logistic requirements of aircraft staging from runways too short for transport aircraft may be formidable and negate the capability for forward basing. The Marine concept for resupply is to utilize cargo helicopters if truck transport

is not feasible. The resupply problem was highlighted in the Defense Department's study report.

The Harrier procurement program is for a planned buy of 114 aircraft. Funding for 60 has been appropriated through FY 1972, and 30 and 24 are to be funded in subsequent fiscal years. The Harrier is a fully operational system with the Royal Air Force in England and with the Marines. The Marine procurement program total is based on providing one 20-airplane squadron to each of the three Marine air wings, a 15-plane training squadron, plus repair pipeline and also attrition aircraft. The Harrier investment cost is \$3.6 million per aircraft.

Neither the A-X nor the Harrier would have significantly improved bombing accuracy over the present close support aircraft using fixed sight or analog computer systems, because neither has the avionics components required to produce the much more accurate and flexible bombing capability of the A-7D and E. As mentioned, the A-X presently is planned to utilize a fixed sight bombing system, so its accuracy would be expected to be equivalent to other aircraft using fixed sights. The A-X will have to press in closer to its targets to reduce bomb miss distances. The Harrier has an inertial navigation system, and the signals from this system are used in an analog computer that has a 25% improvement in accuracy over the A-4M. It still falls far short of the capabilities already demonstrated in the A-7D/E, and lacks the flexibility of the latter system. Thus neither of these new aircraft as now planned will have the accuracy potential available with the digital computer-aided bombing system.

THE ATTACK HELICOPTER CANDIDATES: CHEYENNE, BLACKHAWK, AND KING COBRA

The testimony and data provided by the Army revealed very clearly the limitations of the present Cobra helicopter gunships. Improvements are needed in basic aircraft performance, including hover capability, payload, and endurance; and in equipment capabilities to provide more operational flexibility at night and in bad weather, in better navigation, and in longer standoff ranges for weapons firing. Field testing by the Army in Europe with the Cobra has validated the operational requirements for these improvements.

The Cheyenne development program was started in 1966 as the Army's advanced gunship replacement for the present Cobra. The Cheyenne was designed from the start to meet the operational requirements and improvement areas mentioned above. It has, however, encountered repeated technical problems.

The crash of a test aircraft in 1969 during a high speed run caused the Army to terminate the fledgling production program, and the Cheyenne has remained in a slow paced development program since that time. Testimony given before the Senate Armed Services' Tactical Air Power Subcommittee during Fiscal Year 1972 authorization hearings indicated that the technical problems with the rotor system that caused the crash of the test plane had been overcome, and an advanced rotor control system that would eliminate the problems was expected to complete development by early 1973. During the time since 1969, while the Cheyenne development was focused on correcting the technical problems of the rotor, the effort was slow-paced because

the settlement of the defaulted production contract was in dispute between Lockheed and the Government.

More recently, alternative candidates for the advanced gunship role were being developed privately by two helicopter companies. Sikorsky's Blackhawk was the first to be airborne, having been flying since August 1970, while Bell's King Cobra started flying a year later in September 1971. These two industry-funded candidates for the advanced attack helicopter mission give the Army a real choice of alternatives for the first time.

The Blackhawk is of the same general size and weight class as the Cheyenne and uses the proven rotor system of the S-61 helicopter series. The Blackhawk at present, however, does not contain an integrated avionics and armament system, and additional time and funds would be needed to develop one. The King Cobra is a significant product improvement growth version of the Cobra, and it does have a complete avionics and armament package. The King Cobra is only approximately two-thirds the size and weight of the Cheyenne or Blackhawk, so its payload capability is proportionately less. Its cost is estimated to be only approximately two-thirds that of the larger two aircraft, however.

The Army is studying these alternatives by way of a cost-effectiveness comparison, with a decision scheduled for the Fiscal Year 1974 budget. Testimony given in the hearings indicated that there were no plans for a fly-off between the candidates to help to determine the winner.¹

The Army shows the comparative investment costs of these three advanced helicopter candidates as follows: Cheyenne, \$3.8 million; Blackhawk, \$3.6 million; and King Cobra, \$2.7 million.

¹ Army testimony on the Fiscal Year 1973 budget, subsequent to the Close Air Support hearings, indicated that all three candidates would be considered.

SUBCOMMITTEE FINDINGS AND RECOMMENDATIONS

After reviewing the testimony and other available information, the subcommittee does not believe that there is any basic or fundamental problem or deficiency with close air support as it exists and is practiced at this time. Close air support given to the soldier on the battlefield has been excellent in past conflicts, and the services have done the best possible, regardless of the color of the uniform, with the equipment they had available. The subcommittee does believe, however, that programs to improve close air support should be pursued. The subcommittee offers the following comments and recommendations on various aspects of close air support.

The present command and control system used by the Air Force-Army and by the Marines and Navy appears to function well and to serve the needs of all echelons of command. The system results in timely allocation of close support missions, and better responsiveness must result from more improvements in aircraft characteristics rather than in the command and control system. Undoubtedly improvements can and will be made in the equipments used in command and control and in the detailed procedures used, but the concept and operation appears basically sound.

The subcommittee believes that the Department of Defense should redefine and assign the roles and missions of close air support. As the report makes clear, in the twenty-four years since the Key West agreement of 1948, a series of interservice agreements and the evolution of helicopter technology have left the original definition and assignment ambiguous and unclear. As a result, an interservice rivalry has been generated which is counterproductive to what should be the goal of both services—to provide the best possible close air support, both qualitatively and quantitatively for the “customer”, the soldier on the ground.

The A-X program is well worthy of the prototyping approach to a new development. The subcommittee believes that a thorough operational test and evaluation of the A-X prototypes should be made so that the using command can provide recommendations on the relative suitability of the A-X for the close air support and interdiction missions. The subcommittee also recommends that this evaluation include a fly-off with the existing close air support aircraft, the A-7D and the A-4M, so that recommendations can result for the future balance in the force structure of these aircraft. The subcommittee recommends that additional A-7Ds should be procured to keep the production line open in the interim period until this fly-off can be made and this force structure question resolved.¹

There does not appear to the subcommittee to be a valid issue of duplication between the Harrier and the A-X fixed wing aircraft. The subcommittee sees the Harrier program as primarily an experiment to

¹ Senator Symington does not concur with this recommendation for procurement of additional A-7Ds.

evaluate the operational utility of V/STOL fixed wing aircraft. The Harrier's range and payload are so limited under VTOL operating conditions that the Harrier could not be justified for this mode of operation alone. Large procurements of VTOL attack aircraft will have to await improvements to the state of the art to permit better operational capability. The Harrier program does offer the chance to obtain true operational experience with VTOL squadrons. In view of the emphasis being placed on future VTOL aircraft in the Navy, with its air-capable ship concept, as well as in the Marines for close support attack aircraft, the subcommittee recommends that the Harriers procured be used to evaluate these concepts of operation. The subcommittee believes, however, that the 60 Harrier aircraft already ordered through Fiscal Year 1972 will be sufficient for this purpose and recommends that no additional Harriers be purchased.

Assuming that questions regarding helicopter vulnerability are resolved successfully, the subcommittee believes that there is a valid requirement for a more capable attack helicopter.

ADDITIONAL VIEWS

SENATOR HAROLD HUGHES

The core of the close-air support controversy is the dispute among the military services, chiefly the Army and the Air Force, over their respective roles in providing air support to ground forces during combat operations.

The casual reader of the Findings and Recommendations of the Subcommittee may not perceive the intensity of the Subcommittee's feelings about the necessity for a prompt settlement of the issues. While the Subcommittee chose not to dictate the precise terms of the settlement, it needs to be emphasized that the dispute cannot be allowed to carry along, unresolved, for an indefinite period.

As yet, the Department of Defense has not made a commitment to complete the roles and missions study that was requested by the House Appropriations Committee two years ago. It should not be surprising, therefore, if Congress refuses to grant production clearances for new close-air support weapons systems until the respective roles and missions are clearly and precisely defined and set out in a formal DOD directive.

It is not sufficient to rely upon the Johnson-McConnell agreement of 1966, in which the Air Force agreed to relinquish all claims to helicopters that provide "fire support." The concept of fire support is undergoing revision. An Area Coordinating Paper on the subject, drafted in the Office of the Director of Defense Research and Engineering, was recently called back for "drastic revision;" it was determined to be "too narrow in scope." If the definition of "fire support" is being significantly broadened, the authorized mission of the Army's helicopter gunships would logically be enlarged, further exacerbating Air Force concern about the narrowing of its role.

My own view is that the Army's right to provide close-air support with helicopter gunships should be protected and that the realities of the modern battlefield require a more capable, advanced helicopter gunship. Commanders of ground units should have a capability for immediate response to rapidly materializing threats near the battle line, using close-air support resources that are organic to his command.

Procurement of an advanced attack helicopter, however, should be delayed until its role is precisely defined and its mission is clearly circumscribed. The Department of Defense directive setting out these definitions should state what targets helicopter gunships will ordinarily engage, how far from the battle line it will ordinarily be permitted to operate, and to the extent possible, the specific missions, such as helicopter escort, fire support for troops in battle, point defense, and reconnaissance by fire.

Without precise definition, the Army can be expected to extend helicopter gunship technology outward, in range and speed, at a time when the real need is for extending it upward, in hover capability and maneuverability, both of which are sorely lacking in the Army's most advanced candidate for the role, the Cheyenne.

ADDITIONAL VIEWS

SENATOR BARRY GOLDWATER

While I concur in a general way with the findings of the full subcommittee's report, I must ask the Subcommittee to insist that the assignment of the Close Air Support mission to the Air Force be reaffirmed by the Department of Defense. I use the word "insist" because I feel strongly that the Department of Defense must make this decision as I do not see it as a function of the subcommittee or the full committee of Armed Services. While the report submitted by Secretary Packard approaches the subject, it, in my opinion, brushes off the responsibility for the ultimate decision and until that decision is made we are going to continue to be plagued with the costs and problems of four tactical air forces.

It is mandatory that the Air Force have the full support of all branches of the Service in recognizing that the Air Force and it alone should be charged with the responsibility of providing Close Air Support. This is not an easy statement for me to make because I have the utmost respect and regard for the aviators of all the Services; however, this country can no longer afford the luxury of four tactical air forces all doing the same thing. The fact that I had service in the Air Force might be charged as the reason that I prepared the Minority Report; this I deny. I first entered the services as an infantry officer and as I have said before, I have great respect for the roles played by all of our services. My concern is imbedded in duplication, a very costly duplication.

It was never intended that each Service would be provided with the means to conduct completely independent combat operations. The Unified Commander is given an appropriate mix of weapons, material and manpower and he is able to effectively engage the enemy through employment of his combined assets. Each Service should contribute the particular force in which it is expert, without overlapping, then collectively, these forces should provide a unified, mutually-supporting combat team. Through this joint approach, economy is promoted, duplication eliminated, and most importantly, more effective combat power is realized.

Close Air Support has remained an Air Force responsibility throughout numerous discussions, studies, and agreements. Every major ground force commander in World War II, Korea, and now Vietnam, has stated his utmost satisfaction with the Close Air Support given their ground forces. The country does not need, nor can it afford, the unnecessary luxury of duplicating combat capabilities among the Services. The Air Force has clearly demonstrated its ability to perform the Close Air Support mission and should be reaffirmed as the Service responsible for this mission.

The helicopter is a vulnerable aircraft. This was proven in Lam Son 719 where losses ran high and operations were curtailed in the higher threat areas. Unless proof is offered to the contrary and offered soon it will be my opinion that helicopters operating as close air support weapons in a sophisticated European environment will not be able to survive the high intensity ground fire they will most certainly encounter.

There are no questions on the armed helicopter's role in escorting troop-carrying helicopters. Nor are there any on the advantages offered by rotary wing aircraft in performing observation and rescue missions. However, a \$4 million plus helicopter gunship with its associated sophisticated equipment is a luxury we cannot afford nor one that we need. Accordingly, it is my recommendation that if the only purpose of the advanced helicopter gunship is to provide Close Air Support, that this entire program be terminated at once.

As long as the Navy continues to operate carriers, we can support their request for carrier-based aircraft to perform missions other than Close Air Support, such as interdiction. But it would be duplication, in my opinion, to call upon the Navy Air for Close Air Support when it can be provided by the Air Force. As long as Marine aviation is dependent upon the Navy carriers, they should operate aircraft that are organic to the Navy as they have historically done.

In order to give the reader an idea of the cost involved as accurately as possible, the following is provided:

1. The cost figures are broken down into two aircraft categories:

(a) Current Aircraft in the inventory and the money which is currently being and has been spent.

(b) The Programmed Aircraft, except 60 Harriers, are still on paper and these figures are the most current estimates available.

2. For further clarifications, Procurement Unit Cost includes the following:

Basic Airframe.

Engine.

Electronics.

Armament.

Other Installed Government Furnished Equipment.

Peculiar Ground Support Equipment.

Peculiar Training Equipment.

Publications.

Technical Data.

Contractor Technical Services.

Installation and Checkout.

Factory Training.

Initial Spares.

3. Program Unit Cost includes all of the above plus Research and Development costs and any military construction associated with the system.

AIRCRAFT COSTS

[In millions of dollars]

Current aircraft	Number of aircraft	Procurement unit cost	Total procurement cost	Program unit cost	Total program cost
A7D.....	387	3.4	1,315.8	3.6	1,393.2
F4C.D. & E.....	2,115	2.4	5,076.0	2.4	5,076.0
A6E.....	180	4.6	828.0	8.3	1,494.0
Cobra.....	800	.5	400.0	.5	400
Programed aircraft	Estimated number of aircraft	Estimated procurement unit cost	Estimated total procurement cost	Estimated program unit cost	Estimated total program cost
AX.....	720	1.9	1,378.0	2.2	1,584.0
Harrier.....	110	4.6	506.0	0	0
Cheyenne.....	465	3.4	1,579.0	4.1	1,906.5

INDIVIDUAL VIEWS

SENATOR STROM THURMOND

In my judgment, the Report of the Close Air Support Subcommittee is sound and is firmly based upon the testimony before the subcommittee during the hearings.

However, because of my deep interest in this subject I am filing these individual views as a means of emphasizing my belief that the Army needs an advanced helicopter gunship and that such a weapon system is complementary to, and not duplicative of, fixed-wing air support.

I believe that the body of this report on close air support does an excellent job of laying a foundation from which present controversy over close air support can be understood. Where the report falls short, in my opinion, is that the findings and recommendations that were reached do not address the issues as directly as might be desired.

In my view, the primary mission of fixed-wing close air support for the Army has traditionally rested with the Air Force and this role is adequately defined in current memoranda and policy. Because of the heavy emphasis accorded air power, the old Army Air Corps separated from the Army in the 1940s, forming a separate service, today's U.S. Air Force. Since the 1940s, time and technology have developed so that the Air Force has emphasized the additional role of extremely long range strategic nuclear bombardment with bombers and intercontinental missiles and the needs of air superiority.

In the hearings the Army supported the fixed-wing close air support role remaining with the Air Force but argued persuasively for the continuation of the helicopter gunships as an integral part of the ground commander's fire and maneuver team. After all, Close Air Support is not an independent mission but stems from the firepower requirements of the man on the ground.

The real question should not be whether or not the helicopter gunship infringes on any service's mission but rather should be, does it save lives among the vulnerable ground forces by performing a job which fixed-wing planes cannot perform?

The issue as to whether or not this country could afford four tactical Air Force planes was injected into the hearings early in the testimony. This "four Air Force question" points to the tactical aircraft squadrons presently centered in the Air Force but also contemplated by a large Navy tactical air structure, the smaller division-wing team structure in the Marines, and the helicopter gunship aviation element distributed throughout the Army.

The Navy's tactical aircraft arm developed as a result of the aircraft carrier. This concept is sound and has served the nation well since the start of World War II. The size of the Navy's tactical fighter complement has been driven by the number of aircraft carriers. This element of our defense structure may be more critical to our security in years ahead as we reduce foreign commitments and thus surrender our overseas air bases.

The Marine tactical aircraft program developed because of the special amphibious mission assigned to them. The Marines, although supported a great deal by Navy tactical air elements, have always demanded and received integrated close air support in the form of a

division-wing team. Such close air support has been supplied by fixed-wing aircraft in the past decade. However, technological advances of recent years have resulted in the integration of vertical and short take-off and landing aircraft like the Harrier and Cobra helicopter gunships into the Marine air-ground team.

The Army's large helicopter aviation element is a recent development resulting from advancements of helicopter technology in the 1950s and 1960s. As the report makes clear, the growth of this aviation element took place in the mid-1960s following the Defense Department's encouragement that Army battlefield mobility be enhanced by the helicopter. As the report further shows, the attack versions of the helicopter evolved naturally from the combat experience of the Vietnam War. The Defense Department and the Congress would be remiss if they did not capitalize on this experience to improve our nation's defense capability.

The key charge raised is that fixed-wing airplanes and attack helicopters duplicate each other. A reading of the report makes it perfectly clear that this is not so. Duplication is a false issue. Close air support is simply an element of the total firepower involved in the land battle, the part of the war that involves the efforts of the ground soldier to occupy and hold ground. The report makes clear that all of the multiple elements of firepower that support the infantrymen in the land battle "duplicate" each other in the sense that they are all used to support him in the battle. Machinegun fire duplicates rifle fire and mortars duplicate artillery fire, but each weapon is different and has its useful and unique application.

Should we eliminate any of the elements of firepower that support the infantryman, since in a way they all "duplicate" one another? To propose to do so would be absurd. Firepower helps the ground soldier win wars; it also saves lives in the attainment of that objective. While the firepower of a weapon may duplicate that of another weapon system when it hits the target, the type of ordnance hitting the target and the means through which it is delivered are often different. The fixed-wing fighter and the helicopter are dissimilar types of aircraft, use entirely different ordnance and deliver it in entirely different types of attack. The fixed-wing aircraft delivers heavy ordnance and makes strafing passes with fixed cannons or rockets. It must approach its target at a high altitude, dive at the target and then pull away. All this time it is exposed to enemy radar and fire. However, the helicopter is not restricted to straight-in attacks over the enemy, and can fire weapons at targets off line-of-flight. It approaches the battle area with caution and precision, using cover of trees and hills, popping up and darting about.

Initially, the Army developed the helicopter gunship to protect its other helicopters. In moving troops by helicopter it was necessary to have some aircraft which could accompany the transport helicopter at the same speed and provide sustained and suppressive fire in the landing zone to protect the troops while they dismounted and took cover. In carrying out this role, the Army learned that the helicopter gunship had other capabilities which fixed wing aircraft could not offer. These included providing its own target acquisition and highly accurate, close-in offensive and defensive fires to the front, sides and rear, while operating at night and during adverse weather.

The attack helicopter moves nimbly about the battlefield in the environment of the ground soldier; it flies; it hovers; it pops up; it darts away. It is an aerial platform for the ground commander. It is manned by infantrymen, cavalrymen, and artillerymen who understand the land battle and who participate on a daily basis as an integral element of Army combat units. It has a place in the spectrum of land battle firepower which cannot be duplicated either by ground weapons or fixed-wing aircraft.

The Subcommittee report did give approval to the attack helicopter concept with these words: "Assuming that questions regarding helicopter vulnerability are resolved successfully, the Subcommittee believes that there is a valid requirement for a more capable attack helicopter."

The question of survivability, frequently used against the helicopter gunship, is being addressed in current Army tests. To date these tests are reaffirming previous favorable findings. Armor plating will make them less susceptible to enemy fire and crash survivable rubber fuel tanks will reduce personnel casualties when a helicopter goes down. In Vietnam approximately half of all downed helicopters were recovered and returned to service. Concurrently, new tactics and techniques are being developed to further enhance survivability.

The question of tactics and employment impacts greatly on the survivability question. Presently the Army plans to use the helicopter in conjunction with its ground forces in overwatching fire roles, attacking enemy penetrations, committing the reserves, exploiting the ground attack and other battlefield situations. Up to 20 advanced attack helicopters are planned per Army division where they will be employed to increase the division firepower and pressure on the enemy, thereby improving the survivability of the ground soldier.

Specifically, I agree that the report should recommend a rewriting of the roles and missions directives. The Air Force assignment to provide fixed-wing close air support for the Army should be reaffirmed. The Army function to operate attack helicopters should be formally established in Department of Defense directives by assigning this mission directly to the Army. This is in consonance with the 1966 agreement between the Chiefs of Staff of the Army and Air Force wherein the Chief of Staff Air Force agreed "to relinquish all claims for helicopter and follow-on rotary wing aircraft which are designed and operated for . . . fire support." Irrespective of this agreement, the issue of firing weapons from advanced attack helicopters and the semantics involved are still detracting from service harmony and what should be the goal of both services: to maximize the firepower support for the soldier on the ground. These mission assignments should have the strong support of the Secretary of Defense and the Secretaries of the Services.

I further believe that the testimony before the Subcommittee made clear that an advanced attack helicopter is required because the technology is in hand to make significant advances over the capabilities of the current attack helicopter. Just as the technology which produced intercontinental ballistic missiles has complemented strategic bomber aircraft, helicopter gunship developments have complemented the means to deliver firepower for the foot soldier. It is here on the ground where the battles are won and lost and where the bulk of casualties are

taken. It is also here on the ground that too few technological achievements of the past three decades have been made.

The Army considers the advanced attack helicopter as its Number One priority program. The Army, as the benefactor of air support, certainly must have its views carefully considered. Army leaders and the average soldier are sold on the helicopter gunship as a technological breakthrough which can make their job easier.

In conclusion, I believe that the Army should be assigned the advanced helicopter gunship responsibility and the role of fixed-wing close air support should be reaffirmed for the Air Force. Fixed-wing air support is critical to the battlefield, as the Army will readily admit, but the day-to-day dirty work left to the ground soldier can be reduced significantly by an advanced attack helicopter. It is not an either/or situation between these two fire support systems. Each is inherently different not only in appearance but in capability. If these two machines duplicate at all, it would be in areas which make up only about 10% of the capability of each—and that in itself may be a tactical advantage in the press of combat.

An early definition by the Defense Department of the role of the advanced attack helicopter gunship as an Army mission would go far towards ending the current and unproductive rivalry between the Air Force and Army on this issue.

INDIVIDUAL VIEWS

SENATOR JOHN TOWER

All of us know through the testimony of Secretary Laird, his staff, and the Secretaries of the Armed Services that there exists today a greater Soviet threat to the security of the United States than at any time in US-Soviet relations. While open hostilities have eased somewhat, the fact remains that Soviet research and development has continued at very high levels. While the United States has reduced its Active Duty forces by about a million men, the Soviet forces remain at their past levels.

Testimony has made us aware of the imbalance between Soviet and United States forces in Europe, particularly in regard to Soviet armor superiority. I believe, as other members of the Subcommittee, that faced with such a threat we should give our servicemen the most up-to-date, effective close air support weaponry available. However, there seems to be considerable controversy as to the proper roles and missions in close air support of the various services and consequently, the appropriate weaponry to support those roles and missions.

While I concur with the body of the report, I do not feel the recommendations spell out with sufficient clarity the proper, even necessary, role of the Navy, Marine Corps, and Army in close support. The National Security Act of 1947 charges the Air Force with the responsibility for "prompt and sustained offensive and defensive air operations." Yet it says nothing about all aviation being the exclusive domain of the Air Force. It, in fact, clearly provides that the Marine Corps and Army shall have organic aviation necessary to the performance of their missions. Department of Defense Directive Number 5100.1 clearly states that the mission of the Air Force is air superiority, not close air support. Further, the DOD assignment to the Air Force of close air support for the Army cannot be considered an exclusive mission as other Services also provide such support to the Army. Therefore, traditionally the Air Force has neither had close air support as its primary mission, nor sole responsibility. The fact that until the development of the A-X the Air Force did not have an aircraft designed primarily for close air support, also indicates that it regards close air support as a secondary mission only.

There is no controversy over whether the Air Force, operating in support of the Army, has the responsibility for air superiority; and once air superiority is guaranteed, multipurpose fighters will become available for close air support on the battlefield. That means the Air Force will continue to have as one of its secondary missions, close air support. However, because close air support is a resource for commanders to fight the ground battle, the primary responsibility for it should fall upon the Services engaging in ground combat—the Army and the Marine Corps. The Air Force and the Navy can certainly provide a surge capability when or where needed, and as their air superi-

ority mission is achieved, they can dedicate an increasing portion of their resources to close air support. But, the Army and Marine Corps must have a dependable, effective source of organic air support. The effectiveness of the Marine air-ground team is a sterling example of the advantages of organic air support. The effective use of both fixed and rotary wing aircraft by the Marines is a clear demonstration of the complementary roles performed by the systems.

There is no overlap in the close air support provided by the Services as some have contended. There are not four air forces doing the same job, as some seem to think. The Army attack helicopters perform a unique mission because of their unique capabilities. The Marine Corps' Harrier also has its individual characteristics that make it, and the tactics for its employment, different from anything with which the Air Force is familiar.

I feel not enough emphasis has been placed in the report on the importance of retaining a vigorous Army attack helicopter program. The helicopter has demonstrated quite well its capabilities in the low-intensity anti-aircraft environment. More recently, during the current North Vietnamese invasion of South Vietnam, the attack helicopter continues to engage the enemy below the cloud cover that has prevented Air Force aircraft from acting regularly in the close air support role. There are many indications that the North Vietnamese used weather to their advantage in the DMZ attack. Obviously, we cannot depend on combat to take place exclusively in good weather.

The DMZ-Quang Tri operation also poses a number of other timely lessons. Attack helicopters are operating regularly in close conjunction with friendly ground elements to assist in the destruction of the enemy, to protect the delivery of reinforcements and the extraction of friendly troops, casualties, and American advisors, to scout enemy forces and provide the vital intelligence to frontline infantrymen and tankers. In short the Army attack helicopter is providing the discrete firepower in a manner which is solely the province of rotary wing technology. In the case of the Vietnamese troops, the attack helicopter is "customer oriented". It best serves the theater commander by being more continuously available than other aircraft to meet the immediate needs of the hardpressed combat soldier. In a further stark combat lesson, Quang Tri demonstrated dramatically the need for an advanced attack helicopter that can defeat enemy armor.

It has been suggested that in a high-intensity anti-aircraft environment helicopters would be too vulnerable to be effective. Yet, helicopter survivability is enhanced using "nap of the earth" techniques, which make helicopters far less exposed to fire than the slow airborne Forward Air Controller so vital to Air Force operations. Redeye and Chaparral-type anti-aircraft weapons have over 90 percent kill probability on these slow-flying FAC's. Without the FAC, the attack fighters must spend a longer time over the area to spot the target. This exposes them to effective anti-aircraft fire; and, even if the attack fighters survive defensive fire, their ability to acquire targets and deliver ordnance with the required accuracy is reduced in the absence of the FAC. The scout/gunship helicopter team, on the other hand, using "nap of the earth" techniques, provides both observation and fire support while avoiding sustained exposure to possible ground fire.

The second point in the report with which I take issue is the recommendation that the Marine Corps Harrier Program be limited to the

Fiscal Year 1972 buy. This would reduce the program from 114 and three squadrons, to 60, or less than two squadrons. The Commandant has already given up two F-4 squadrons for this program, which requires three squadrons—two for a rotational base in the United States and one to be deployed overseas.

The report regards the Harrier as an experimental program. Gentlemen, it is not. The RAF has had two squadrons deployed in NATO (Germany) since 1970 and has accumulated 25,000 hours of operational flight. The Marine Corps itself has two years of operational experience with the aircraft; one year of maintenance teams and pilots with the RAF in the United Kingdom, and one year of operation in the 2nd Marine Aircraft Wing during which they have flown 2500 accident-free hours. The deployment capability, concept of operations, logistics support and ability to operate from sea bases has been proven. During the past year the Board of Inspection and Survey Trials certified the aircraft for service use; a weapons deployment 1500 miles from home base demonstrated beyond doubt the deployability of the aircraft and two deployments aboard an LPH proved the capability of the AV-8 to operate from simple sea bases without catapult or arresting gear. An exceptional sortie rate was proven during the DOD Sortie Rate Validation Test in which the required four sorties per day sustained and six surge were exceeded by attainment of a sustained rate of 6.4 and a surge rate of over 10 sorties per aircraft.

Questions have been raised about the payload and range of the Harrier when operating VTOL. However, the Marines have developed an operational concept for the AV-8 which maximizes the effectiveness by operating from small austere bases, close to supported units. They would normally use the aircraft in the short take-off mode which results in a very substantial payload of 5000 pounds over a mission radius of well over 100 miles. The responsiveness to the needs of the ground units in this mode is extremely high. Also, the high sortie rate resulting from ease of maintenance and rapid recycling permits the Marines to deliver over twice the ordnance on target per day as can be achieved with conventional aircraft such as the A-4 and F-4 operating from jet capable airfields remote to the combat area. These characteristics, which were amply demonstrated during Operation Versatile Warrior, provide the most responsive, most effective close air support available with today's technology. This is obviously of extreme importance where Marines are in contact with the enemy and minutes can mean lives of men.

It is clear to me then that the aircraft is not experimental. The Marine Corps already has developed the concepts for its use and is most enthusiastic about the program. To cut off procurement now, with \$12 million already committed to the FY 1973 buy, would close the production line and kill the program, for there would not even be the aircraft necessary for two full strength squadrons.

In view of the above, I would urge that if the roles and missions of the Services are to be changed at all, sustained, day-to-day close air support should be the primary responsibility of the Services actually engaged in ground combat—the Army and Marine Corps. Whether or not there is a roles and missions change, the importance of the Army attack helicopter program should be reaffirmed and the forward-looking Marine Corps Harrier Program retained.

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