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U.S. COMBAT AIR POWER

Reassessing Plans to Modernize Interdiction Capabilities Could Save Billions



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Congressional Committees

The military services plan to spend more than \$200 billion on aircraft and other interdiction weapons over the next 15 to 20 years to add to their already extensive capabilities to interdict an enemy. The current national military strategy asserts that modernizing U.S. forces is vital to preserving the combat edge they now have, but it also challenges the Department of Defense (DOD) to make investments only "where there is clearly a substantial payoff."

To determine the reasonableness of planned enhancements, we evaluated the military's current aggregate interdiction assets for striking enemy targets and the contribution of planned modernization programs to total interdiction capabilities. This report contains a recommendation to the Secretary of Defense that would enhance DOD's requirements processes.

This review was part of our broader effort to assess how DOD can better adapt its combat air power to meet future needs. We are addressing this report to you because of your responsibility for the issues discussed and your interest in the subject.

Richard Davis
Director, National Security
Analysis

U.S. Combat Air Power:
Reassessing Plans to
Modernize Interdiction
Capabilities Could Save
Billions

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Executive Summary

Purpose

In recent years, the U.S. military's interdiction and other combat mission priorities have changed. During the Cold War, the enemy was more clearly identified and defense forces were geared to fight that enemy. The threat has changed dramatically, from a single global threat to smaller, less easily defined regional threats, and the size and structure of defense forces are changing as well. The military is challenged to ensure that its funding is directed to the most critical priorities as the forces are reduced and reshaped to meet future national security needs. Yet the services plan to spend more than \$200 billion on aircraft and other weapons over the next 15 to 20 years, adding to their already extensive capabilities to interdict an enemy. To determine the reasonableness of these planned enhancements, GAO evaluated (1) the military's current and future aggregate interdiction assets for striking enemy targets and (2) the effect of the services' planned modernization programs on total interdiction capabilities and alternatives to those programs. This review was part of GAO's broader effort to assess how the Department of Defense (DOD) can better adapt its combat air power to meet future needs.

Background

During the Cold War era, the armed forces of the United States were trained, organized, and equipped to counter the global Soviet threat. Extensive modernization of the forces during the 1980s provided the nation with immense military power. With the collapse of the Soviet Union, a single enemy no longer poses an immediate threat to U.S. survival. Instead, America faces a broad range of less serious challenges such as regional strife, insurgencies, and civil wars. DOD now requires that its smaller force be able to fight and win two nearly simultaneous major regional conflicts (MRC)—one in the east, another in the west. Part of the national strategy for fighting and winning our nation's wars is to have weapons that can interdict—divert, disrupt, delay, or destroy—enemy targets before they can be used against U.S. forces, thus better controlling the battlefield and minimizing U.S. and allied casualties. During two MRCs, U.S. forces may confront more than 100,000 targets. They include artillery, tanks, personnel carriers, bridges, and fuel storage sites.

The Air Force, the Navy, and the Marines primarily use their combat aircraft to strike these ground targets. The Navy also uses sea-launched missiles, and the Army can use Apache helicopters and ground-launched missiles. In addition, all the services use precision-guided munitions. While these weapons can be used for interdiction, almost all of the combat aircraft and helicopters can be used in other roles such as close fire support. DOD's national military strategy, considers modernization, where

there is "substantial payoff," to be vital to preserving the U.S. forces' current combat edge and ensuring future readiness. The Defense Planning Guidance for fiscal years 1997-2001 also highlights DOD's commitment to an affordable long-term modernization program. The DOD-sponsored Commission on Roles and Missions of the Armed Forces (the Commission) issued a report in May 1995 on current and future capabilities, including those used for interdiction.¹

In weighing the merits of the services' weapon modernization proposals—including those for interdiction, various entities within the Office of the Secretary of Defense provide independent analyses as needed to the Secretary. The Joint Requirements Oversight Council (JROC) examines military requirements from a joint perspective in advising the Chairman of the Joint Chiefs of Staff and the Secretary on these modernization proposals. To support the JROC, a Joint Warfighting Capabilities Assessment process was set up in 1994 to examine joint warfighting requirements from a mission area perspective.

Results in Brief

The services have aggregate forces capable of hitting interdiction targets in numerous overlapping, often redundant, ways during two MRCs. They have designated at least 10 ways to hit nearly 65 percent of the total expected ground targets, and some targets could be hit by 25 or more combinations of aircraft, missiles, bombs, or precision-guided munitions. Yet the services' modernization plans would increase to over 85 percent the number of targets that could be hit 10 or more ways.

Given the services' ample interdiction capabilities and continuing questions over future defense spending, some planned modernization programs may not be sound investments. Each service has proposed upgrades or new weapons that may offer little additional interdiction capability. For example, the Air Force's planned upgrade to the B-1B bomber and the Navy's F/A-18E/F procurement add more redundancy at a high cost. The effect of other planned modernization—the Army's purchase of more Army Tactical Missile Systems (ATACMS), Comanche helicopters and its upgrade to the Apache helicopter as well as the services' purchases of more precision-guided munitions—on interdiction capability is unclear. DOD does not assess interdiction modernization proposals in terms of the adequacy of aggregate capability. Without such an assessment, DOD has

¹Directions for Defense, Report of the Commission on Roles and Missions of the Armed Forces, (Washington, DC: GPO, May 1995), which is referred to in this report as Directions for Defense.

little assurance that its interdiction capabilities are properly sized to meet mission needs, or whether more cost-effective alternatives exist.

Principal Findings

Services Have Abundant Interdiction Capabilities, Yet Plan to Add More

GAO's and others' analyses showed that the services have more than enough capability to hit identified ground targets for the two MRCs. Combat air power has been and is expected to remain a primary interdiction force, as it was during the Persian Gulf War. The forces available today, however, significantly exceed those used during the Gulf War, and other weapons that could also contribute to the mission—the Navy's Tomahawk Land Attack Missile, the Army's Apache and Comanche helicopters and ATACMS, and all the services' precision-guided munitions, for example—are increasingly available. Additionally, the services' responsibilities for hitting targets overlap and exceed 100 percent. For example, to interdict 80 percent of one target type, a Commander in Chief (CINC) allocated a percentage of the targets to each service so that in total, the allocation exceeded the total number of targets by 140 percent. Further, the services have multiple ways to hit the same target. For example, 1 target type can currently be hit with 21 combinations featuring 6 different aircraft, 1 type of missile launcher, and 10 types of munitions. Moreover, the number of options in this example is not unusual—some targets can be hit by at least 25 combinations.

Despite the numerous interdiction capabilities, the services plan to spend over \$213 billion to modify some of their weapons and buy others. This cost does not include over \$72 billion for the F-22 or the cost of the Joint Strike Fighter aircraft, which will affect the budget to 2010 and later. Six of the programs will cost an estimated \$188 billion over the next 15 to 20 years: the Air Force's modification of the B-1B for conventional use, the Navy's purchase of 1,000 F/A-18E/F aircraft, the Army's upgrade of about 750 Apache helicopters and purchase of about 1,300 Comanche helicopters and 2,800 ATACMS, and all the services' purchase of 260,000 precision-guided munitions. Implementing all of the services' planned modernization programs could pose problems for DOD. According to GAO's analysis of DOD's Future Years Defense Program, these modernization initiatives will cost at least \$45 billion during fiscal years 1995-2001.

Assessment of Total Capabilities Offers Opportunity to Seek Alternatives to Modernization Programs

The environment in which the services develop modernization plans does not encourage them to take into account the aggregate capabilities available in the other services. Rather, each service maintains its own view about how it can ensure that its interdiction targets are hit. For example, GAO reported in 1993 that the Navy had not justified the need for the F/A-18E/F aircraft based on threat and had not explored options other than Navy fixed-wing aircraft.² Recognizing the need for oversight in developing requirements, JROC was established to assess service modernization initiatives. However, to date the Council has not focused on the possibility of making trade-offs among major weapons. Moreover, the Joint Warfighting Capabilities Assessment process is too new to evaluate its contributions to the debate over modernization proposals. Additionally, the Commission on Roles and Missions recommended that DOD do a cost-effectiveness study to determine the appropriate combination and quantities of attack capabilities in its current inventory as well as those under development by all the services. The study is expected to be completed by mid-1996.

During this review of DOD's interdiction capabilities, GAO assessed the relative contribution of all the services' weapons. This analysis served as a basis for determining whether planned modernizations will provide substantial payoff and for developing options for DOD to consider when assessing investments in some of these modernization programs.

B-1B

Rather than modify and sustain the B-1B force, the Air Force could retire its B-1Bs as soon as possible, based on the presumption that their targets could be hit by other available interdiction weapons. It could then use the resulting savings—nearly \$4 billion in modernization costs and nearly \$1 billion in annual operating costs—for other initiatives.

Several factors make the continued need for B-1Bs questionable. DOD considers its current capability sufficient to successfully meet its requirement to interdict enemy targets identified in two MRCS. Also, GAO and the Air Force estimate that the modified B-1B would strike a very small percentage of the Air Force's designated enemy targets, and Unified Command officials stated they would use far fewer B-1Bs than are cited as necessary by DOD. In addition, other Air Force and Navy aircraft can launch the same munitions as the modified B-1B as well as others. Finally, although their impact is not yet known, new or improved weapons such as

²Naval Aviation: Consider All Alternatives Before Proceeding With the F/A-18E/F (GAO/NSIAD-93-144, Aug. 1993), which is referred to in this report as Naval Aviation: Consider All Alternatives.

helicopters, ATACMS, and other precision-guided munitions could be used to strike interdiction targets as well.

F/A-18E/F

The Navy could reconsider its F/A-18E/F aircraft procurement plans and instead consider procuring more F/A-18C/Ds. These aircraft could be used for interdiction until the next generation strike fighter achieves operational capability. The Navy proposes spending almost \$90 billion for 1,000 F/A-18E/Fs to replace the A-6, F/A-18C/D, and the F-14 as they are retired. We believe that this plan appears to contradict the national military strategy, which cautions against making major new investments unless there is "substantial payoff." Based on recent assessments, the operational capabilities of the E/F model may only be marginally improved over the F/A-18C/D model, yet would cost substantially more. The C/D model, which proved its capabilities in the Gulf War, is still in production and is being improved at a cost of \$1.5 billion.

ATACMS and Army Attack Helicopters

The Army investments in ATACMS and improved Army helicopters could affect the future force structure. However, the value of these weapons for interdiction is unknown because the services have not determined how they fit into the mission. While these weapons add redundancy to aggregate interdiction capabilities, they also add new capability that could reduce the need for some aircraft. An examination of their value as part of the military's total interdiction capabilities could aid in deciding how much money to invest in each.

The Army plans to spend about \$63 billion to purchase ATACMS and Comanche helicopters and to modify its Apache helicopters. With these modernizations, the Army could independently interdict ground targets, and when added to the aggregate capability, these weapons could minimize the risk associated with some of the options to Air Force and Navy modernization programs discussed previously. The Army, for example, has suggested that the ATACMS may be useful in hitting 27 to 40 percent of the interdiction target types, depending on the enemy. However, the services have not resolved how the ATACMS should be coordinated with other services' assets to interdict such targets. Furthermore, the Army plans to limit the use of the Apache and the Comanche helicopters to supporting its ground maneuver operations. Although Army officials said they will be used for maneuver warfare, they were used in interdiction roles during the Gulf War. Until these doctrinal and operational control issues are resolved, the potential utility and interdiction contribution of these weapons are unknown.

Precision-Guided Munitions

The services plan to spend over \$40 billion to develop and buy precision-guided munitions with improved accuracy, some with the capability to be launched hundreds of miles from interdiction targets, thereby reducing the risk to aircrews and aircraft. For example, GAO's analysis shows that by 2002 the Air Force and the Navy will require about 28 percent fewer flights to successfully hit their targets because of these munitions' enhanced accuracy. However, future force structure plans do not indicate that the services expect to reduce the force below that cited in DOD's bottom-up review because of the greater use of precision-guided munitions. Should these munitions prove as effective as anticipated, it may be possible to reduce some force structure without reducing overall capability or, as the services suggested, to minimize the risks to pilots and aircraft.

Recommendations

GAO recommends that the Secretary of Defense routinely review service modernization proposals based on how they will enhance the current aggregate ability of the U.S. military to perform the interdiction mission. Such a process should prioritize funding for those capabilities that contribute most to meeting joint operational requirements and assist in determining the appropriate mix and quantities of interdiction capabilities. Moreover, proposals that add redundancy—such as the B-1B and Apache modifications and the purchase of F/A-18E/Fs, ATACMS, attack helicopters, and precision-guided missiles—should be examined in the context of the additional interdiction capability they offer. This analysis could serve as the basis for deciding funding priorities, the sufficiency of investment, and the future force structure. GAO recognizes that some weapon systems are multimission and that this recommended assessment should consider the potential contribution to those other missions.

Agency Comments and GAO's Evaluation

In written comments (see app. III) on a draft of this report, DOD agreed with GAO's recommendation that the Secretary of Defense routinely review service modernization proposals based on how they would enhance the current aggregate capability of the U.S. military to perform the interdiction mission. DOD noted that changes were needed to its requirements determination process in order to assess the need for modernization proposals in terms of the threat, the adequacy of current aggregate capabilities to conduct interdiction, and the contribution that the modernization proposal would make to aggregate interdiction capabilities.

DOD did not believe that it should initiate another process to review service modernization proposals. It said that these reviews were best implemented by making changes to their existing process. GAO agrees with this approach. GAO's intent was not to institute a new process, but rather to incorporate the necessary analysis required to assess the aggregate capabilities of the services to perform interdiction before deciding on the need for force modernization.

DOD disagreed that the services planned to add more interdiction capability at high cost, despite the fact that they had ample forces to meet current and future interdiction needs. However, DOD acknowledged that its deep attack/weapons mix study is being done to identify cost-saving reductions to current plans. This study was recommended by the Commission on Roles and Missions because of its concern that DOD may have greater quantities of strike aircraft and other deep attack weapons than it needs. GAO also points to the recent Chairman of the Joint Chiefs Program Assessment, in which he states that tactical aircraft procurement plans call for greater than expected resources. To reduce the strain on resources, the Chairman recommends that the services identify programs that could be slowed or terminated.

DOD partially concurred with other issues discussed in the report. Its comments were considered in finalizing this report.

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Abbreviations

ATACMS	Army tactical missile system
BAT	brilliant anti-armor
CBMR	Capabilities Based Munitions Requirements
CEM	Combined Effects Munition
CINC	Commander in Chief
DOD	Department of Defense
FYDP	Future Years Defense Program
JSF	Joint Strike Fighter
JDAM	Joint Direct Attack Munition
JROC	Joint Requirements Oversight Council
JSOW	Joint Standoff Weapon
MLRS	Multiple-Launch Rocket System
MRC	major regional conflict
SFW	Sensor Fuzed Weapon
TLAM	Tomahawk Land Attack Missile
WCMD	Wind Corrected Munitions Dispenser

Introduction

During a war, the U.S. national leadership expects the military forces to conduct large-scale, sustained combat operations with the goal of winning quickly with as few casualties as possible. Interdiction missions are part of the strategy for achieving this goal. These missions are part of the effort aimed at denying the enemy sanctuary and freedom of action. Targets may include such things as tanks, bridges, and factories that when destroyed make opponents easier to attack and defeat. Combat aircraft have predominately been used to fulfill interdiction missions because they generally offer the versatility and capability to strike at the enemy when and where needed.

In recent years, U.S. military services' interdiction and other combat mission priorities have changed. During the Cold War, the enemy was more clearly identified, and defense forces were geared to fight that enemy. The threat has changed dramatically, from a single global threat to smaller, less defined regional threats, and the size and structure of defense forces are changing as well. As the services draw down their forces, the Department of Defense (DOD) is grappling with questions about how to maintain technological superiority over potential adversaries within expected budgets.

The National Military Strategy

During the Cold War, the national military strategy was to contain communism through nuclear and conventional deterrence. DOD emphasized aspects of military power most useful for that purpose, including standby nuclear forces that combined bombers and land- and sea-based missile systems, forward-deployed forces in Europe and Northeast Asia, and reinforcements ready to deploy from the United States.

With the end of the Cold War and the collapse of the Soviet Union, the United States faces no immediate threat to its survival. Therefore, the national military strategy is being altered to meet new, lessened threats. For example, the President, Chairman of the Joint Chiefs of Staff, and the Secretary of Defense identified the involvement in two nearly simultaneous major regional conflicts (MRC) as the most demanding threat—one in the east, another in the west. In addition to preparing to counter these threats, DOD will more likely be distracted by less easily defined and smaller contingencies. The modernization of U.S. forces is considered vital to preserving the combat edge they now enjoy and to ensuring future readiness. The strategy cautions against making major modernization investments unless there is "substantial payoff."

DOD's Defense Planning Guidance for fiscal years 1997-2001 states its commitment to developing an affordable, long-term modernization and recapitalization program. This program is to (1) inject new technologies to modernize existing platforms and upgrade mission capabilities, (2) introduce modernized replacements for existing systems that substantially upgrade capabilities and lower operation and support costs, and (3) field new systems for which there is no like item in the inventory. DOD asserted that introducing these capabilities should better leverage joint warfighting capabilities and, in some instances, allow consideration for making compensating reductions elsewhere in the force.

In November 1993, Congress established the Commission on Roles and Missions of the Armed Forces¹ to study the way the services allocate roles and missions, to consider alternatives, and to recommend changes to the process to better meet future needs. The Commission comprised civilian and retired military officials appointed by the Secretary of Defense in consultation with Members of Congress. In Directions for Defense (May 24, 1995), the Commission reported that while each service develops valuable capabilities, considering these capabilities jointly is key to effective future unified operations.

The Four Phases of U.S. Combat Operations

As part of the national military strategy and as reported in the Secretary of Defense's January 1994 Annual Report to the President and the Congress, the military services have planned for four phases of operations: halting the invasion, building up U.S. combat power while reducing the enemy's, defeating the enemy, and providing post-war stability. Interdiction may play a role in the first three phases. The significance of the role may vary according to the circumstances.

During phase 1, the services seek to quickly minimize the territory and strategic facilities the invader can capture and ensure that the threatened ally can continue its crucial role in the collective effort to defeat the aggressor. High priority missions for U.S. forces during this phase include direct attacks on advancing enemy forces; air defense and ballistic missile defense to protect rear areas; attacks on selected high-value strategic assets, such as centralized command and control sites; interdiction of lines of communication critical to the enemy's offensive; and suppression of enemy air defenses.

¹The Commission was authorized in the National Defense Authorization Act for Fiscal Year 1994 (P.L. 103-160, Nov. 30, 1993).

Once the enemy attack has been stopped, phase 2 begins, and U.S. and allied efforts focus on continuing to build up combat forces and logistics support in theater, reducing the enemy's capacity to fight and ensuring that the enemy does not regain the initiative.

During phase 3, U.S. and allied forces may mount a large-scale, air-land counteroffensive to defeat the enemy by attacking its centers of gravity, retaking territory it occupies, destroying its war-making capabilities, and successfully achieving other operational or strategic objectives. In many cases, U.S. forces would also threaten or carry out amphibious assault landings in the enemy's rear areas.

Following a U.S.-coalition victory, military forces remain in theater to ensure that the conditions that resulted in conflict do not recur. These forces may also help repatriate prisoners, occupy and administer some or all of the enemy's territory, assist in reestablishing friendly governments in liberated areas, or ensure compliance with the provisions of a cease-fire agreement or peace accord.

The Services' Interdiction Mission

Under DOD Directive 5100.1, the Air Force is primarily responsible for air interdiction missions, but the Army, the Navy, and the Marines are expected to interdict enemy forces as a collateral mission. While the services do not limit interdiction to any particular area on the battlefield, they generally strike at targets beyond the close fire support area to avoid hurting friendly forces.

In line with the changes proposed by the Commission on Roles and Missions, the services are working out how to better conduct joint operations. Joint commanders can use interdiction to divert, disrupt, delay, or destroy the enemy's surface military potential before it can effectively be used against friendly forces. Military guidance on joint interdiction operations is still evolving, however. Joint Publication 3-0, entitled Doctrine for Joint Operations and issued in 1995, states that the services should fight together and cites examples of joint interdiction missions. The Air Force and the Army have draft joint doctrine publications that provide more details on how joint interdiction operations would work. Joint Publication 3-03, Doctrine for Joint Interdiction Operations, drafted by the Air Force, describes how the services should coordinate the use of their forces during the joint missions. The Army's draft of Joint Publication 3-09, Doctrine for Joint Fire Support, describes how the services might better synchronize the use of firepower in all

missions to ensure success. According to an official in the Office of the Joint Chiefs of Staff, these publications may be approved in the fall of 1996.

Interdiction Targets

During two major regional conflicts, U.S. military forces expect to encounter over 100,000 mobile or fixed targets. Mobile targets include tanks, personnel carriers, artillery, trucks, and missile launchers. Fixed targets include bridges, highways, railyards, fuel storage sites, and power production sites. Striking at various targets becomes more critical at different times during a war, depending on how the targets support the enemy or threaten friendly forces. For example, during phase 1 of a war, halting the enemy's movement may make it critical for the services to interdict mobile targets such as tanks and artillery.

Interdiction Weapons

The services' weapons for interdicting targets include aircraft, missiles, and helicopters. Each service traditionally has individually determined the capabilities it needs to fulfill its missions. The Air Force, the Navy, and the Marines expect to use large portions of their combat aircraft for interdiction missions. These aircraft can also be used for other roles, such as close air support or air superiority. During the Gulf War, however, most of the combat sorties by U.S. attack aircraft were flown for interdiction missions (see table 1.1).

Table 1.1: Flights for Interdiction During the Gulf War

Service	Aircraft	
	Type	Use (percent)
Air Force	F-15E	92
	F-16	84
	F-111	70
	F-117A	100
	A-10	79
	B-1B	^a
	B-2	^a
	B-52	95
Navy/Marine Corps	A-6	49
	AV-8B	52
	F-14A/D	^b
	F/A-18	42

^aThe B-1B and B-2 were not used in the Gulf War.

^bThe F-14's contribution to interdiction was not specified.

In addition to fixed-wing aircraft, weapons such as the Navy's Tomahawk Land Attack Missile (TLAM), the Army's Tactical Missile System (ATACMS) and attack helicopters, and the services' precision-guided munitions can also be used to interdict targets.

Objectives, Scope, and Methodology

To illustrate the need to compare the services' plans for improving their interdiction capabilities, we evaluated (1) the services' current and future aggregate interdiction assets for striking identified enemy targets and (2) the effect of the services' planned modernization programs on total interdiction capabilities and alternatives to those programs. This report is one of a series of reports assessing how DOD might better adapt its combat air power to meet future needs. Other reports in this series address close fire support, air superiority, suppression of enemy air defense, surveillance and reconnaissance, and aerial refueling.

To assess the services' aggregate interdiction capabilities, we identified how the services plan to hit expected targets now and in the future. We relied on threat assessments by the Defense Intelligence Agency and the military services to identify the number and type of targets. We also reviewed doctrine of the Office of Joint Chiefs of Staff, the Air Force Doctrine Center, the Navy Doctrine Command, and the U.S. Army Training

and Doctrine Command to identify how the services have been authorized to perform interdiction missions.

Officials from the Office of the Secretary of Defense and from the Air Force, the Army, the Marine, and the Navy headquarters provided information on current interdiction capabilities and modernization plans. Additional views on capability and operational perspectives were provided by the Air Force's Air Combat Command, the Army's Training and Doctrine Command, the Navy's Commander in Chief (CINC) Atlantic Fleet, and the Marine Forces Atlantic.

We also obtained data on how each service plans to hit interdiction targets identified for two MRCs now and in the 2002 time frame. Air Force headquarters officials provided an extract from the database it uses to determine wartime conventional munition requirements. This data linked targets to the likely munitions and the aircraft to be used against them. The Air Force's analyses ensure it has sufficient capability to interdict the targets it is apportioned by the Unified CINCS. Navy headquarters officials provided a similar database for the targets that the Navy and the Marine Corps are assigned to hit with their fixed-wing aircraft. In addition, information on the targets that might be hit by the TLAM was also provided by the Office of the Chief of Naval Operations. In compiling their data, the Air Force and the Navy assumed the availability of all munitions in the inventory and suppression of enemy air defense aircraft. The U.S. Army Field Artillery and the U.S. Army Aviation Warfighting Center also provided information on the targets that the ATACMS and Apache and Comanche helicopters might hit.

We compiled the services' data to determine aggregate capabilities to interdict ground targets (see app. I for the aircraft and missile launch system combinations). We analyzed this data in several ways to identify redundant capabilities in the services. We then assessed whether various service modernization proposals would add new capability or more redundancy to the ways the services have to hit the targets.

The database we developed had the following limitations:

- The data represents a snapshot of capability at points in time. Changes in threat, force structure, budget, or national military strategy could significantly alter its validity.
- We did not validate the Air Force's and the Navy's models linking targets to munitions and aircraft.

- We added Navy TLAM and Army ATACMS data to show the targets they might hit, even though the services had not used the weapons in their model for determining their sufficiency to interdict designated targets.
- We could not evaluate the full impact of some modernization proposals because they will not be completely implemented by 2002, the last year of the services' data.

We discussed the modernization proposals and some alternatives with officials at the Office of the Secretary of Defense, the services' headquarters, and the U.S. Atlantic Command, Central Command, European Command, and Pacific Command. We also interviewed officials at the Air Combat Command; the U.S. Air Forces and Army Europe; and the U.S. Pacific Air Forces, Army, and Navy. We also reviewed documents they provided relevant to our analysis.

In our analysis of current capabilities and future force options, we considered information from our prior reports, the Commission on Roles and Missions of the Armed Forces, RAND, the Institute for Defense Analysis, the Center for Strategic and International Studies, the Congressional Research Service, and the Congressional Budget Office.

We conducted this review from April 1994 to November 1995 in accordance with generally accepted government auditing standards.

Services Now Have Enough Interdiction Capabilities and Plan to Add More

When viewed in the aggregate, the services' weapons constitute a major force capable of interdicting targets in numerous overlapping, and often redundant ways during two MRCs. The services have concluded, and we concur, that they have enough capability to carry out the national military strategy. Furthermore, the Congressional Research Service reported concern about and the Commission on Roles and Missions concluded that the United States may have more than enough interdiction capabilities. Nevertheless, the services are proposing to add to their interdiction capabilities by modernizing some weapons and buying more of others between 1995 and 2010.

The Services Are Confident They Have Sufficient Forces to Hit Expected Targets

Combat air power has been and is expected to remain the primary interdiction force, as it was during the Gulf War. However, other weapons are increasingly available for interdiction missions—the TLAMs and ATACMS and potentially the Army's Apache helicopters. As shown in table 2.1, the interdiction forces available in 1995 significantly exceed the combat air power and missiles used during the Gulf War.

Chapter 2
Services Now Have Enough Interdiction
Capabilities and Plan to Add More

Table 2.1: DOD's 1995 and Gulf War Interdiction Platform and Missile Types

Service	Platform/missile type^a	Available in 1995	Used in Gulf War^{a,b}
Air Force			
Fixed-wing aircraft	F-15E	138	48
	F-16	765	215
	F-111	54	66
	F-117	36	42
	A-10	144	146
	B-1B	60	0
	B-2	7	0 ^c
	B-52	74	66
Navy/Marine Corps			
Fixed-wing aircraft	A-6E	119	116
	AV-8B	185	84
	F-14A/D	268	109
	F/A-18A/C/D	799	167
	A-7E	0	24
Missile	TLAM	2,100	298
Army			
Helicopter	Apache (AH-64A)	758	245
Missile	ATACMS	1,197	32

^aGulf War Air Power Survey, Volume V: A Statistical Compendium and Chronology (U.S. Air Force, Washington, D.C.:1993).

^bAdditional U.S. weapons were available.

^cNot in inventory.

DOD and the services assert that current interdiction forces are sufficient to successfully execute the national military strategy, that is, to fight in concert with regional allies and decisively win two nearly simultaneous MRCs. They base this assertion on target and other information that served as the basis for several analyses testing the sufficiency of the U.S. forces proposed in DOD's bottom-up review and to support future requirements. According to the Secretary of Defense, the Joint Chiefs of Staff's recent "Nimble Dancer" extensive war games included an air campaign exercise that tested the ability of the 1997 and 2001-05 forces to win two conflicts based on hitting the designated targets. The results of these tests, according to the Secretary of Defense, validated the ability of these forces to meet the challenge.

Our Analyses Confirm That Services Have Abundant, and Sometimes Redundant, Capability

Our analyses of the services' data show that they have more than enough capability to hit the identified ground targets for the east and west MRCs. In fact, we found that in the aggregate, the services' responsibilities for hitting targets overlap considerably, and the services have many ways to hit the same target.

In doing our analyses, we assessed information from a variety of sources, including the Air Force and the Navy data used in their Capabilities Based Munitions Requirements (CBMR) development process. Following DOD's CBMR process, the Air Force and the Navy assessed the munitions needed to defeat the threat from 1995 through 2002. Using Defense Intelligence Agency target data, they matched the interdiction targets to be hit to the services' 29 munition and 14 combat aircraft types. The Unified CINCS associated with the east and west regional conflicts determined the percentage of targets each service would be expected to hit. The sum of munitions required to adequately destroy each region's targets became part of the basis for the services' total munitions requirements.¹

The Air Force and the Navy databases linking targets to munitions and combat aircraft were of particular value because they allowed us to assess the adequacy of the expected combat air forces to meet mission needs based on the Unified CINCS' apportionment of targets to the services. Our databases confirmed that the Air Force, the Navy, and the Marines have sufficient munitions and aircraft in 1995 and 2002 to interdict the targets. By adding target information on the Navy's TLAM and the Army's ATACMS to the combat air forces' target data, we identified the services' aggregate interdiction capabilities available for each MRC. This approach also enabled us to identify redundancies in interdiction capabilities. These redundancies were expressed two ways: as overlapping service responsibility for the same targets, and as multiple ways to hit the same target.

Services' Coverage of Targets Overlaps

The Unified CINCS apportion more than 100 percent of the targets to the services. For example, one CINC assigned the Army 5 to 10 percent, the Navy 20 to 30 percent, the Marines 15 to 25 percent, and the Air Force 65 to 75 percent of one target type—a total apportioned range of 105 to 140 percent coverage—even though the CINC's objective was to destroy only 80 percent of the target quantity. This over-apportionment creates a margin of safety and allows flexibility to ensure targets will be hit even if

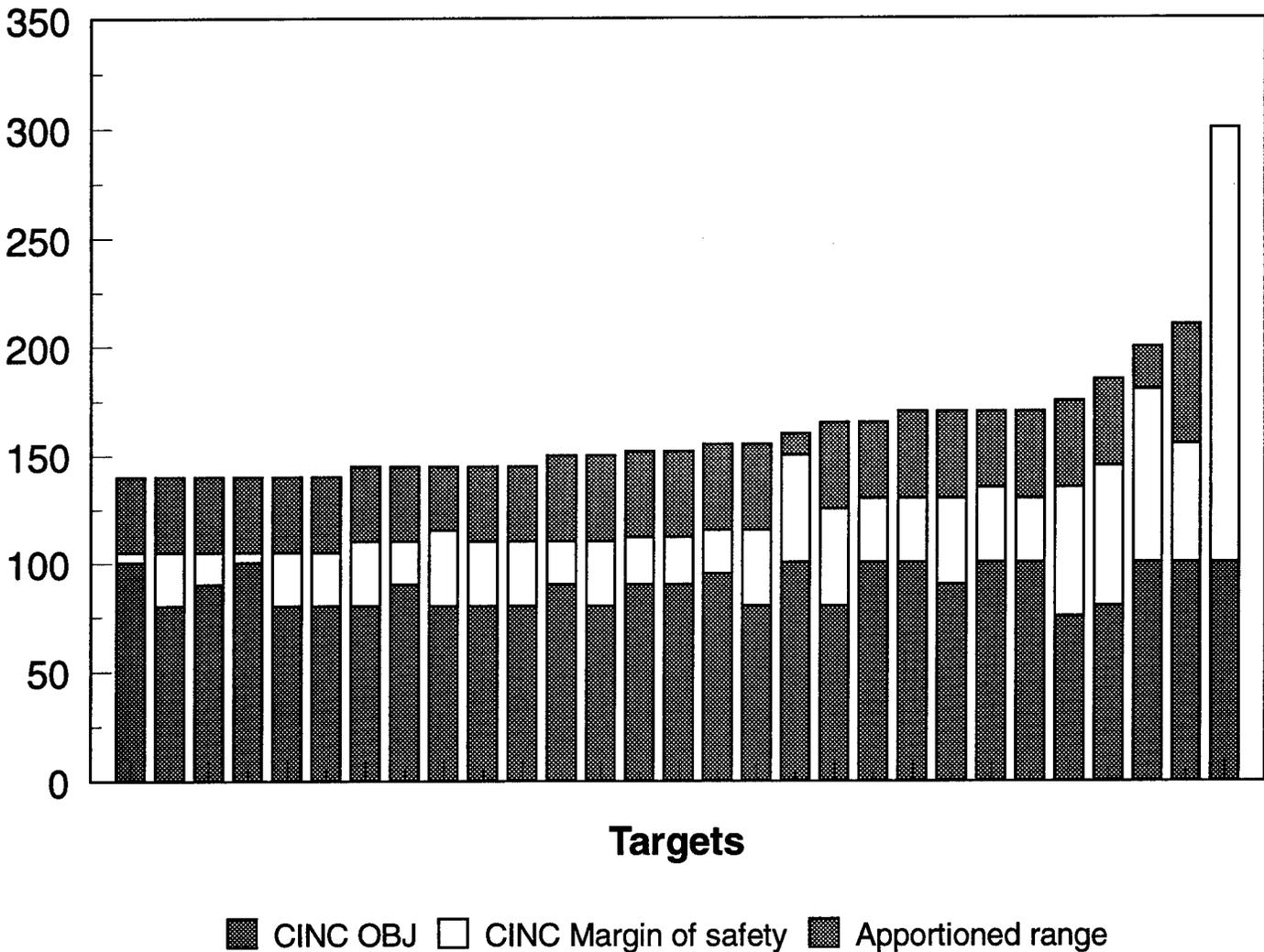
¹The results of these assessments were reported in the Air Force's Nonnuclear Consumables Annual Analysis and the Navy's annual report Nonnuclear Ordnance Requirements.

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some expected capabilities are not available. However, it also establishes the expectation that the services would acquire and maintain sufficient forces to provide this level of target coverage and thus would be maintaining a significant amount of redundancy. Figure 2.1 shows the apportionment of targets for one MRC (providing specific target names would require the figure to be classified).

Figure 2.1: Redundant Targets Apportioned in One Major Regional Conflict

Percentage



Services Have Numerous
 Ways to Hit the Same
 Targets

Redundancy can also be expressed in the number of ways the services have to hit targets. As an example, table 2.2 shows the number of aircraft or other means of delivery and the munition combinations the services designated to interdict one type of target (the specific name of the target is classified).

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Table 2.2: Current Ways to Hit One Type of Target

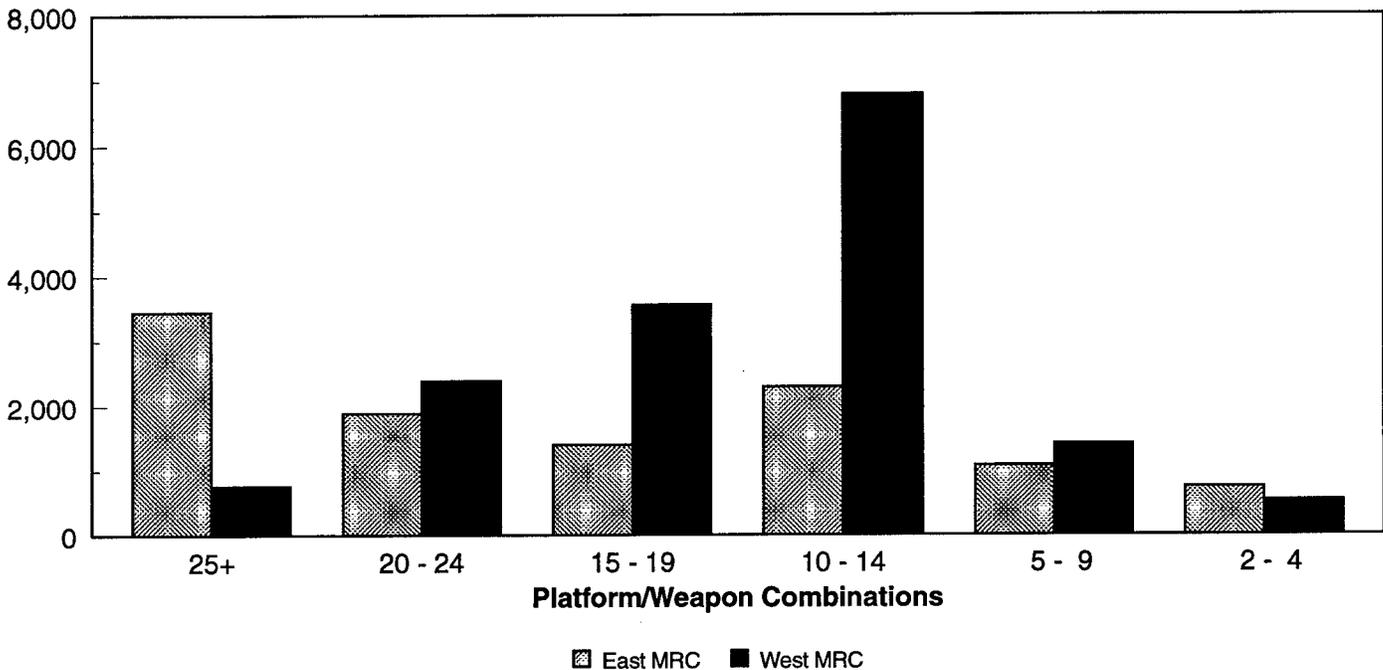
Munition	Platform						
	A-6	A-10	F-16	F-14A/B	F-14D	F/A-18A/C	MLRS ^a
AGM-65D Maverick			X				
AGM-65G Maverick		X	X				
IIR Maverick	X					X	
Laser Maverick	X					X	
Walleye	X					X	
MK-83				X	X	X	
MK-84	X		X	X	X	X	
MK-82		X					
MK-82R		X	X				
ATACMS							X

^aMultiple-launch rocket system.

All 21 combinations involving 6 different aircraft types and a missile launcher shown in table 2.2 might not be used, but the services assume that these combinations will be available. Moreover, the number of options represented is not unusual. The services currently have 10 or more ways designated to hit nearly 65 percent of the Defense Intelligence Agency-identified ground targets. By adding the additional ways envisioned in 2002 to those ways designated in 1995 that would continue to be available, 86 percent of the targets can be hit 10 or more ways. As shown in figure 2.2, some targets can be hit more than 25 different ways.

Figure 2.2: Multiple Ways to Interdict Designated Targets

Target Quantities



Services Plan to Add
 More Interdiction
 Capability at High
 Cost

Despite the fact that the services have ample forces to meet current and future interdiction missions, they plan to add even more capability by modernizing some platforms, missiles, and munitions and buying more of others over the next 15 to 20 years, at a cost exceeding \$213 billion. The services expect these improved weapons to interdict targets with more accuracy and lethality and to increase aircraft and pilot survivability. Each service has proposed the following:

- The Air Force plans to (1) upgrade its B-1B bomber for conventional use, (2) buy and develop more conventional precision-guided munitions, and (3) retire the F-111 aircraft (due to an Office of the Secretary of Defense decision) and buy the new F-22 and Joint Strike Fighter (JSF) aircraft to replace other aircraft.
- The Navy plans to replace and/or retire its A-6, F/A-18A/C/D, and F-14 aircraft with the new F/A-18E/F and the JSF aircraft and to continue to buy

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and develop more of the improved TLAMs and precision-guided munitions. The Marines plan to replace the AV-8B and F/A-18C/D aircraft with a short takeoff and vertical landing version of the JSF aircraft.

- The Army plans to buy 2,800 improved ATACMS, upgrade its Apache helicopters, and buy nearly 1,300 new Comanche helicopters.
- All services plan to buy more precision-guided munitions.

In total, these plans will affect the current mix of aircraft and missile types in 2001 and 2010 (see table 2.3).

Table 2.3: DOD's 1995, 2001, and 2010 Interdiction Capabilities

Service	Platform and missile types		
	1995	2001	2010
Air Force			
Fixed-wing aircraft	F-15E	F-15E	F-15E
	F-16	F-16	F-16
	F-111		
	F-117	F-117	F-117
	A-10	A-10	A-10
	B-1B	B-1B	B-1B
	B-52	B-52	B-52
	B-2	B-2	B-2
		F-22	
		JSF	
Navy/Marine Corps			
Fixed-wing aircraft	A-6E		
	AV-8B	AV-8B	AV-8B
	F-14A/D	F-14A/D	F-14A/D
	F/A-18A/C/D	F/A-18A/C/D	F/A-18A/C/D
		F/A-18E/F	F/A-18E/F
		JSF	
Missile	TLAM	TLAM	TLAM
Army			
Helicopter	Apache (AH-64A)	Apache (AH-64A)	Apache (AH-64A)
		Apache Longbow	Apache Longbow
			Comanche
Missile	ATACMS (Block I)	ATACMS (Block I, Ia, II)	ATACMS (Block Ia, II, IIa)
Precision-guided munition types	14	20	20

Others Conclude That the Services Have More Than Enough Interdiction Capability

According to the Congressional Research Service and the Commission on Roles and Missions, the services have more interdiction capabilities than may be needed now and in the future. They based their conclusion on their assessment of the current forces and their view that the services' requirements development processes tend to yield competing, sometimes redundant, service-specific solutions.

The Congressional Research Service reported in 1993 and again in 1995 that critics complained about the overlap in the services' airpower and the excessive costs incurred to provide that capability. It also expressed the belief that duplicative capabilities should be eliminated but may remain because the services are reluctant to rely on each other.²

The Commission was more pointed in its conclusions. It reported in May 1995 that DOD may have greater quantities of strike aircraft and other deep attack weapons than it needs and noted that the total capability is increasing. The Commission attributed the increase to the addition of conventional bombers, growing inventories of improved precision-guided munitions, and plans to buy stealth aircraft. Because of these concerns, the Commission recommended the prompt initiation of a DOD-wide cost-effectiveness study focused on finding the appropriate combination and quantities of deep attack capabilities currently fielded and under development by all services. This effort, entitled "The Deep Attack Weapons Mix Study," is now under way at the direction of the Secretary of Defense.

Agency Comments and Our Evaluation

DOD agreed that the services appear to have an abundant interdiction capability but said that these capabilities must be viewed in terms of flexibility, multimission capability, and availability. We agree that these are considerations in assessing the sufficiency of assets in relation to expected requirements. However, independent analyses and DOD's own statements suggest that it also believes that aggregate capabilities could be excess to requirements. For example, the most recent program assessment by the Chairman of the Joint Chiefs of staff concluded that procurement plans included more than tactical aircraft resources could pay for and therefore recommended that the services identify programs that could be slowed or terminated. Taken together, we believe that the conclusions of both external experts and statements by DOD suggest that there may be cost-saving alternatives to planned modernization programs.

²Four U.S. "Air Forces: Overlap and Alternatives (Congressional Research Service, 93-823 F, Allan W. Howey, Sept. 10, 1993) and Military Roles and Missions: A Framework for Review (Congressional Research Service, 95-517 S, John M. Collins, May 1, 1995).

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DOD also noted that we had overstated available interdiction assets by adding together all the possible weapons that a single aircraft might employ. We acknowledge that a single aircraft can deliver only the munitions it carries on a single sortie. However, the services would not expect to attack all targets at the same time. Given the likelihood of multiple sorties by many aircraft, we do not believe that our analysis overstates the services' capabilities.

Finally, DOD said that today's interdiction forces exceed those used during the Persian Gulf War because that war represented a single major regional contingency, whereas current assets are geared for two such contingencies. We do not agree with this line of reasoning in that the interdiction assets available at the time of the Gulf War were those planned to counter the former Soviet Union in a possible global war—a much more demanding scenario than the current two MRC strategy.

An Assessment of Aggregate Interdiction Capabilities Yields Alternatives to Proposed Modernization

Given questions about future defense spending levels, the diminished threat to U.S. security, and the services' statements that they have ample interdiction capability, some modernization proposals may not be sound investments. Some of these investments offer limited or unknown additional capability to the current abundant interdiction assets. For example, the Air Force's planned upgrade to the B-1B bomber and the Navy's F/A-18E/F procurement appear to add more redundancy at a high cost. Also, it is uncertain what value the Army's ATACMS and Apache Longbow and Comanche helicopters and the services' thousands of precision-guided munitions will add to interdiction capabilities.

The Commission on Roles and Missions concluded, and our analysis confirms, that the appropriate combination and quantities of capabilities should be assessed because the services plan to add more redundancy to that which already exists. We have included options in this chapter based on our analysis of the services' total capabilities to hit targets designated by the CINCS. While the options presented here are not the only ones possible, they illustrate the kind of trade-offs DOD should find useful when evaluating whether the investments called for in current and future service modernization plans provide substantial payoff. Consideration of the services' capabilities in the aggregate, with an understanding of how the weapons will be used and how that use will affect other services' forces, could yield more cost-effective alternatives to the services' current proposals.

Requirements Process Encourages Services to Propose Modernization Individually

Modernization plans such as those currently proposed evolve from each service as its solution to a perceived need. Because each service proposes improvements to its capabilities separately, the services do not necessarily recognize that, together, their improvements result in substantial, sometimes redundant, military capabilities. The services' modernization plans are developed through a requirements generation process that also encourages each service to maintain its own view of how its own capabilities should be enhanced to ensure interdiction targets are hit. As noted by the Commission in its 1995 report, "each Service is fully engaged in trying to deliver to the CINCS what the Service views as the best possible set of its specific capabilities—without taking into account the similar capabilities provided by the other Services." The Commission report states that, on one hand, this is desirable because "competition among the Services produces innovation in weapon systems, forces, doctrine, and concepts of operations that yield the dramatically superior military capabilities we need." However, this decision process does not ensure that

the services consider the capabilities available in the total force. For example, in a 1993 report, we asserted that the need for the F/A-18E/F had not been adequately justified based on threat or as a cost-effective solution to a recognized military need. Furthermore, the Navy had not explored options other than Navy fixed-wing aircraft.¹ While analyses of capability based on threat or cost-effectiveness are advantageous, a DOD examination of the contribution of a new capability in the context of the total force could yield a different investment decision. Because DOD and the services do not routinely assess the services' capabilities in the aggregate, there is no assurance that modernization proposals will yield substantial payoffs.

This acquisition environment has existed for some time. In a 1992 report,² we noted the similarity of major acquisition issues addressed in work over the preceding 15 years. The report noted that acquisition programs begin as individual service solutions to mission needs. The organizations responsible for developing requirements for new weapons generally represent individual branches within the services that analyze their own mission area deficiencies and recommend solutions in terms of their own type of assets. Therefore, while the general threat may be legitimate and individual program analyses objective, the processes for developing weapon system requirements tend to narrow consideration of alternatives and favor the promotion of particular weapons that may be the services' preferred solution, not the best solution to a valid need. These service organizations' institutionalized advocacy of the weapons under their purview helps perpetuate the funneling of successor weapons into the acquisition process.

In leading up to its recommendation that DOD conduct a cost-effectiveness study of the appropriate combination and quantities of deep attack capabilities by all services, the Commission indicated the environment described above still exists. Also, the Commission pointed out that no one in DOD has specific responsibility for making this decision.

The Joint Requirements Oversight Council (JROC) was established, led by the Vice Chairman of the Joint Chiefs of Staff, to oversee the services' requirements generation processes. JROC assessed 10 joint warfighting areas, such as "strike" and "air superiority," to determine whether the effectiveness of existing and planned capabilities can be enhanced. These joint warfighting capability assessments became the basis for the Chairman's program and budget recommendations to the Secretary of

¹Naval Aviation: Consider All Alternatives (GAO/NSIAD-93-144, Aug. 1993).

²Weapons Acquisition: A Rare Opportunity for Lasting Change (GAO/NSIAD-93-15, Dec. 1992).

Defense. Most of the Chairman's 1995 guidance concerned the financial implications of the services' current plans, but the assessments did not explore ways to reduce costs by suggesting specific trade-offs among major modernization proposals.

Services' Proposed Modernization Programs Have Budget Implications

With a high level of uncertainty surrounding future defense spending, the services' proposed modernization of interdiction capabilities—at a projected cost of more than \$213 billion over the next 15 to 20 years—could pose a significant problem. According to our analysis of DOD's Future Years Defense Plan (FYDP) data, the services' modernization programs will cost at least \$45 billion in fiscal years 1995-2001. Moreover, the services' planned \$213 billion plus modernization costs do not include the \$72 billion that the F-22 is estimated to cost or the eventual cost of the JSF aircraft. These costs will affect DOD's budgets out to 2010 and later.

The Services Face a Less Serious Threat

The Commission and others conclude that today's threat is considerably different from the Soviet threat that previously dominated U.S. military force planning, preparation, and funding. A single enemy no longer poses an immediate, nuclear threat to U.S. survival, and no one is expected to achieve military capabilities challenging those of the United States during the next 20 years. Overt attacks on the United States and its strategic interests are unlikely because few nations will have the resources to succeed in such attacks. Instead, America faces a broad range of less serious but more likely challenges such as regional strife, insurgencies, civil wars, and operations other than war. While the proliferation of weapons and technology is expected to allow some nations to buy state-of-the-art systems or upgrade those they have, the extent of their investment will be limited by budget constraints. In addition, an investment in a few improved systems does not equate to an integrated, modernized force.

Some Planned Modernizations May Not Be Sound Investments

By comparing the expected contribution of weapons resulting from the services' modernization plans to current total U.S. military interdiction capability, we assessed the significance of their impact on the forces' ability to hit targets associated with two MRCs. Our analysis indicated that some proposals may not be sound investments. For example, the Air Force's B-1B upgrade and the Navy's F/A-18E/F procurement may add more redundancy at a high cost. Others, like the Army's ATACMS, the Apache Longbow and Comanche initiatives and the services'

precision-guided munitions proposals, may add expensive new capabilities without a clear understanding of the extent they are needed or their potential impact on other services' forces.

We determined how the services' plan to hit interdiction targets for the two MRCs based on Air Force and Navy CBMR data, possible TLAM and ATACMS targets, and CINC target allocations. After aggregating this data, we assessed the interdiction contribution of various weapons. We identified which targets each weapon was designated to hit in 1995 and 2002, how these designations changed between those points in time, and other possible ways to hit those same targets. This allowed us to focus on the interdiction contribution of those weapons if they are modified or added to the services' capabilities. Our analysis caused us to question whether some investments yielded a substantial payoff, and to develop options for some modernization proposals. We recognize that some systems have multimission capabilities and that in making decisions impacting them, the potential contribution to those other missions should be considered.

Air Force Could Save Billions by Retiring the B-1B

In light of the ample capability to hit the few targets assigned the B-1B, retiring the aircraft could save almost \$4 billion in modernization costs and nearly \$1 billion annually in operating costs that could be used for other initiatives. Retirement of the aircraft would increase U.S. forces' dependency on other capabilities and therefore the risk that some targets might not be hit as quickly as desired. However, it is reasonable to expect that the targets could be hit by other U.S. military assets, including missiles such as ATACMS and TLAM.

Should the risk associated with retiring the B-1B be unacceptable, another option is to use the nearly \$4 billion to buy up to 80 more F-15Es. Considered the Air Force's premier air-to-ground fighter, the F-15E launches a wide variety of munitions, adds flexibility to air operations, and would still save operating funds.

B-1B Modification to Improve Conventional Capability

The Air Force plans to spend nearly \$4 billion to increase the conventional capability and sustainability of the B-1B to make it the backbone of its conventional bomber force. Currently, the B-1B's ability to conduct conventional missions is limited because it can carry only the 500-pound unguided, general-purpose bomb. The Air Force therefore plans to (1) upgrade the avionics to enable the B-1B to drop cluster bomb units and mines, (2) improve the electronic countermeasures system to ensure that the B-1B is not vulnerable to sophisticated enemy air defenses, and (3) add

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a global positioning system and other modifications to integrate the use of precision-guided munitions with its other systems.

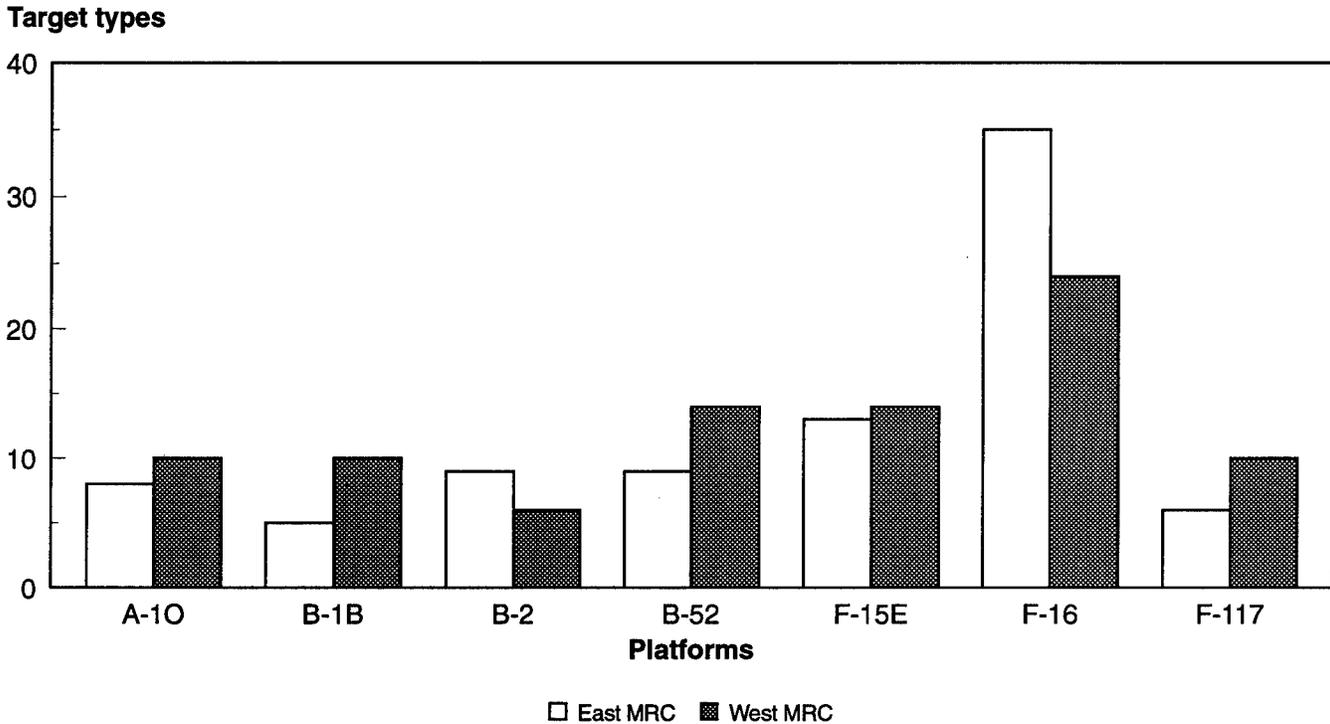
By 2002, the improved B-1B will be expected to deliver several precision-guided munitions: the Joint Direct Attack Munition (JDAM) and the Wind Corrected Munitions Dispenser (WCMD), with either the Combined Effects Munition (CEM) or the Sensor Fuzed Weapon (SFW). Eventually, the B-1B will also deliver the Joint Standoff Weapon (JSOW). Many other aircraft are also expected to launch these and other more potent weapons.

The nearly \$4 billion modernization also includes \$400 million for the B-1B's sustainment modifications. Changes include engine upgrades to correct safety and high maintenance problems, enhancements to simulator systems used by flight crews and maintenance personnel for initial qualification and continuation training, and improvements to the antenna.

B-1B Plays a Minor Role in Interdiction

According to Air Force modeling, even after the proposed modifications, the B-1B's contribution to interdiction is expected to be minor when compared to the services' total interdiction capability. The specific percentage of targets to be destroyed by the B-1B is classified. However, figure 3.1 shows the B-1B's expected contribution in 2002 compared to other Air Force aircraft in terms of target types it is designated to hit.

Figure 3.1: Target Types to Be Hit by Each Type of Air Force Aircraft



Unified CINCs Would Use
 Fewer B-1Bs Than Bottom-Up
 Review Required

According to the Air Force, the B-1B's greatest contribution would be to halt enemy aggression during the early days of a conflict. While officials in the Unified Commands agreed that bombers would be valuable, they also said they expect to use far fewer than the 100 bombers the bottom-up review cited might be necessary for a MRC. Furthermore, the Air Force's analysis of its bomber force in the years 2001-05 shows that the B-1B does not make a unique contribution because other bombers or fighters hit the same types of targets it hits in the first 7 days of a conflict. As shown in table 3.1, the target the B-1B would most frequently strike in 2001 can be hit 20 other ways.

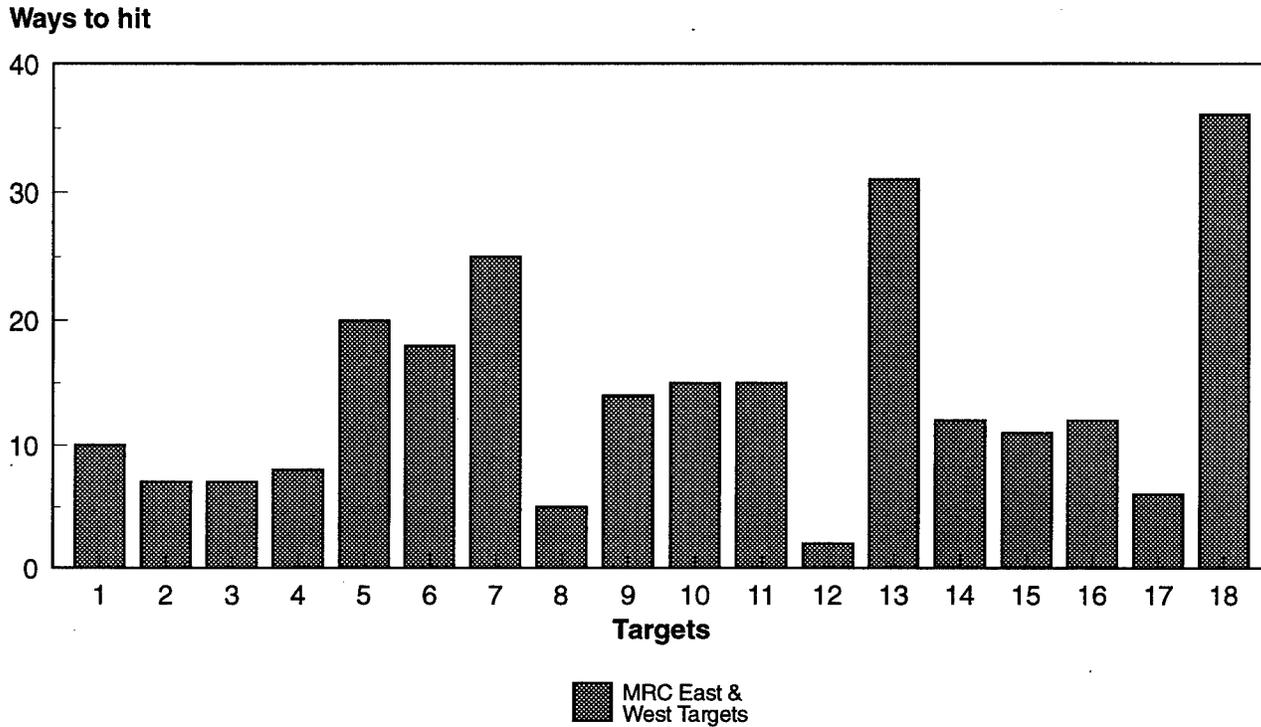
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Table 3.1: Multiple Ways to Hit B-1B's Most Frequent Target During the First 7 Days of a Conflict

Munition	B-1B	B-2	B-52	F-15E	F-16	MLRS
GBU-12				X	X	
GBU-15				X		
GBU-24				X	X	
MK-82	X	X			X	
MK-82R					X	
MK-82R/B-1B	X					
MK-84				X	X	
MK-84R					X	
M-117			X			
JDAM/MK-84	X	X	X	X	X	
AGM-65G					X	
AGM-130/BLU-109				X		
ATACMS-Block I						X
ATACMS-Block IA						X

Air Force modeling shows that, as the conflict continues, the B-1B's relative contribution to the war becomes even smaller. Moreover, service data shows that as in the first 7 days, the B-1B's targets are not unique, and in 2002 the services are expected to hit the same 18 target types numerous (one over 35) other ways (see fig. 3.2).

Figure 3.2: Other Ways to Hit B-1B Targets Throughout a Conflict



Eight of the target types designated for the B-1B in 2002 were different from those assigned in 1995. These new B-1B targets are already designated to be hit in 1995 by 4 to 21 other combinations. The two B-1B target types hit the fewest other ways in 2001 are currently designated to be attacked at least four other ways. With the exception of one aircraft, all missiles, aircraft, and munitions comprising these four ways are still expected to be available in 2002, but they are not the preferred way designated for hitting these targets.

In direct response to a draft of this report, DOD said that our cost for the B-1B upgrade appeared to include operations and maintenance items other than the specific cost required for the upgrade. However, the \$4 billion cited is the expected total program cost for modernizing the B-1B. In addition to funds for the Conventional Munition Upgrade Program, it includes the amounts for modifications to enhance the B-1B's

sustainability and to upgrade equipment in the squadrons. If the B-1B were retired, more of the associated costs would be avoided.

The Navy Could Save Billions by Reducing Its Purchase of F/A-18E/F Aircraft

As an option for saving funds and at the same time retaining interdiction capabilities, the Navy could reconsider its F/A-18E/F aircraft procurement plans and instead consider procuring more F/A-18C/Ds to meet its needs. The Navy is still purchasing the C/D model, and ongoing and planned modifications costing about \$1.5 billion will improve the aircraft's survivability and ability to acquire and accurately strike targets. Changes in the F/A-18 procurement plans could save billions of dollars.

The Navy Plans to Replace Existing Aircraft at a Cost of Nearly \$90 Billion

The Navy plans to buy 1,000 F/A-18E/F fighter aircraft at a total estimated cost of nearly \$90 billion. The Navy will buy the first E/Fs in fiscal year 1997 and expects to own almost 700 by 2010. The E/F was designed to replace the A-6, F/A-18C/D, and F-14 aircraft as they reach the end of their service lives and are retired. Compared to the C/D, the E/F was projected to perform the same mission but to be more survivable, carry more weapons, and have greater range. However, more recent assessments show that F/A-18E/F capabilities will be marginally improved over the F/A-18C/D model.

The E/F's Contribution to Interdiction Does Not Appear Substantially Greater Than That of the C/D

Our analysis of the Navy's target database shows the F/A-18C/D's interdiction role is virtually identical to that of the F/A-18E/F. Both aircraft are expected to hit the same targets with the same type weapons. The C/D can carry all the Navy's current strike weapons and is expected to carry precision-guided munitions such as the JDAM and the JSOW. While the E/F's range advantage could allow it to more effectively employ the additional weapons it can carry, a Congressional Budget Office memorandum reported the Secretary of the Navy as stating that about 85 percent of the service's targets are within 200 miles of shore and are therefore within the C/D's range. According to the Gulf War air power survey commissioned by the Air Force, the F/A-18C/D proved its combat capabilities and effectiveness during Operation Desert Storm when it dropped more than 17,500 tons of ordnance on a variety of ground targets. It was the only aircraft that during a single mission acquired, identified, and in air-to-air combat destroyed two enemy aircraft and then delivered munitions to a ground target. Further, the E/F's contribution to the interdicting ground targets is not expected to be unique relative to the services' total capabilities. For example, table 3.2 shows the expected interdiction

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contribution of the E/F in 2002 against one of its targets and the 20 other ways also expected to be available to hit that target.

Table 3.2: Multiple Ways to Hit One Type of F/A-18E/F Target

Munitions	Platform									
	B-2	B-52	A-10	F-15E	F-16	F-14 A/B	F-14D	F/A18 A/C	F/A18 E/F	MLRS
WCMD/CEM	X	X		X	X					
WCMD/SFW	X			X	X					
AGM-65D			X							
AGM-65A/B			X							
CBU-87			X							
CBU-97				X	X					
ROCKEYE (FMU-140)						X				
MK-83							X			
MK-84					X		X			
JSOW (BLU-108)					X			X	X	
JSOW/CEB					X					
ATACMS										X

The difference in the unit cost of the two models is substantial. The Navy plans to buy 1,000 F/A-18E/F fighter aircraft for the Navy and the Marine Corps at an estimated total program cost of nearly \$90 billion. Based on total program costs, each F/A-18E/F would cost about \$89 million under a 1,000-aircraft buy while the current unit procurement cost of the F/A-18C/D is about \$51 million based on procurement of 12 aircraft.³ However, if the Marine Corps does not buy F/A-18E/Fs, the Navy could reduce the E/F procurement quantity. The C/D model, which proved its capabilities in the Gulf War, is still in production and is being improved at a cost of \$1.5 billion.

In its comments on our draft report, DOD said that we should use the expected flyaway costs rather than total program costs in comparing the costs of the two aircraft. Although we acknowledge that DOD often uses flyaway costs in this manner, we believe that it is appropriate to use the total program costs for the F/A-18E/F since the focus of our comparison is

³These cost figures are adjusted for estimated inflation for the years of the procurement. Cost comparisons vary widely based on assumptions about the quantities procured, annual production rates, and the specific costs included.

on future budgetary impacts.⁴ In contrast to the C/D model that the Navy has procured for a number of years, most of the research and development costs and the investment in operations and support for the E/F model have not yet been incurred.

Army Weapons and All Services' Precision-Guided Munitions Hold Potential for Use in Interdiction

When considered in concert with other interdiction capabilities, the ATACMS and Army helicopters as well as the services' planned precision-guided munitions could affect the future force structure. However, the potential value of these weapons is unknown because the services have not resolved how they fit into joint interdiction operations. At a minimum, these weapons appear to introduce more redundancy into the services' aggregate interdiction capabilities, but they could also add new capability that would reduce the need for some aircraft. Even if the force structure cannot be reduced, a further examination of their value to interdiction in light of the total capability could help in deciding how much money to invest in each.

The Army and the Air Force have not yet resolved doctrinal differences about the use of Army weapons for interdiction. The ATACMS, as well as Army helicopters, could provide significant, sometimes unique, capabilities to interdiction missions. However, how the Army should use these weapons, unilaterally or in support of joint interdiction operations, must be resolved before the contribution of these weapons can be calculated. Decisions about the joint use of Army interdiction weapons could also better define the amount of these capabilities the Army actually needs to buy.

Planned purchases of precision-guided munitions could allow for other force options in the future. DOD's bottom-up review cited the use of precision-guided munitions as a means of minimizing risk as the force size is reduced.⁵ However, the extent to which current procurement plans meet or exceed this expectation is not clear. Since precision-guided munitions are expected to be more accurate, aircraft would be required to fly fewer sorties, fewer aircraft may be needed, and survivability is expected to increase. Should these attributes be realized, weighing their potential contribution instead of modernizing or purchasing some aircraft could save money.

⁴A forthcoming GAO report on the F/A-18E/F program will provide a more detailed analysis of the relative flyaway costs of these two aircraft.

⁵Bottom-Up Review: Analysis of Key DOD Assumptions (GAO/NSIAD-95-56, Jan. 1995).

ATACMS and Helicopter
Modernization to Give the
Army Deep Attack Capabilities

While acknowledging that the Air Force's air power dominates interdiction missions, the Army plans to increase and improve its deep battle capabilities at a cost of about \$63 billion. The Army's modernization programs are intended to give ground commanders the ability to rapidly detect, select, and destroy targets in support of ground maneuvers through the depth of the battlefield. Planned expenditures include

- \$4.6 billion for 2,800 ATACMS, including over 20,000 brilliant anti-armor⁶ (BAT) and BAT pre-planned product improvement submunitions;
- \$8.4 billion for improvements to its 758 Apache helicopters; and
- more than \$50 billion for the development and acquisition of 1,292 Comanche helicopters.

ATACMS is a family of munitions that will be phased in through 2008; all will be fired from the MLRS M270 launcher. The Block I munition has an antipersonnel, antimaterial warhead with a range exceeding 150 kilometers. The Block Ia munition, scheduled for delivery in fiscal year 1998, will carry a smaller warhead but attack the same targets as the Block I munition, with increased accuracy over 300 kilometers away. The Block II munition, with a range of 140 kilometers, will be fielded in fiscal year 2001. It will carry 13 BAT submunitions effective against moving or stationary hard targets plus mobile surface-to-surface missile launchers. Last, the Block IIa munition, scheduled to be delivered in fiscal year 2004, will deliver improved BAT submunitions to ranges greater than 280 kilometers. It will be used against the same targets as Block II at greater ranges.

In addition to the ATACMS, the Army plans to upgrade its 758 AH-64A (Apache) helicopters to the AH-64D (Apache Longbow) model during fiscal years 1997 through 2013. The upgraded Apaches will be easier to navigate; have the Longbow's Global Positioning System; improved communication, survivability, and reliability; and the millimeter-wave radar. In addition, 227 of the 758 Apaches will also be equipped with the Longbow fire-control radar and upgraded engines. This upgrade will give the Army its first fire-and-forget missile capability. The fire control radar will detect, classify, and prioritize targets at night, through smoke and dust and in adverse weather. The Apache Longbow could be effective against most interdiction targets and will continue to be capable of firing the Hellfire and Longbow Hellfire missiles.

⁶BAT is an unpowered, gliding, terminally guided, top attack anti-armor submunition designed to locate, attack, and kill moving armored combat vehicles such as tanks and fighting vehicles.

The Comanche is expected to be a multimission helicopter capable of armed reconnaissance and attack. It features technology that will make it less detectable, enable it to engage multiple targets simultaneously with high lethality, and provide day/night, adverse weather fire-and-forget capability. Under current plans, the Comanche will be fielded starting in fiscal year 2006. It can be used against almost all of the Apache's targets plus radar sites and will fire the Hellfire, Longbow Hellfire, and Stinger missiles.

ATACMS Contribution to Interdiction Is Unclear

The extent to which ATACMS are needed is not clear because the services have not resolved how they will be used and who will control them. The Army is developing ATACMS to interdict enemy targets because of its unique attributes. It can hit enemy targets up to 200 kilometers away less than 12 minutes after target acquisition, day or night, in any weather, with increased survivability over manned systems. Based on the Army's ATACMS target data, these missiles would be appropriate to employ against up to 27 percent of the target types in one MRC and 41 percent of the target types in the other. The services have not yet resolved disputes over the control and coordination of deep battle assets such as ATACMS; however, the Air Force and the Army disagree about whether the Joint Force Air Component Commander (usually Air Force) or the Land Component Commander (usually Army) can best control the deep battle and consequently operational use of ATACMS. Army officials believe the Joint Force Commander should address the question of control during the initial planning for a conflict. Until these issues are settled through doctrine or some other means, the expected battlefield contribution or the possible force structure implications of buying 2,800 more ATACMS is in question.

Army Attack Helicopters' Potential May Not Be Realized for Joint Operations

The Army is buying significant interdiction capability with the acquisition and modernization of its helicopters. The Apache helicopter can perform multiple roles and missions, including deep attack operations and suppression of enemy air defenses. The Comanche will also be able to perform multiple roles, including armed reconnaissance and air combat. Both helicopters are capable of attacking most interdiction targets, but no interdiction targets have been designated for helicopters.

The Army considers attack helicopters to be responsive, precise, highly lethal deep strike systems. However, because the Army considers helicopters maneuver assets, it has restricted their use from joint interdiction operations. The extent to which the helicopters could be used for joint interdiction missions is therefore unclear because the same

dispute about who should control the use of ATACMS appears to also apply to the Army's attack helicopters.

The services have invested or plan to invest over \$40 billion to acquire 23 different types of precision-guided munitions (including the TLAM) and over 260,000 total munitions (see app. II). They expect these munitions to offset reductions in force size by increasing their accuracy and lethality through the use of target location information from inertial navigation systems, laser guidance systems, Global Positioning System satellites, or a combination of these and other sources.⁷ The services identified a specific need for increased munitions accuracy during Operation Desert Storm, when 37 percent of the Air Force's and the Navy's strike sorties were ineffective due to bad weather.

The services expect precision-guided munitions such as JDAM to add accuracy and lethality against ground targets and increase aircraft survivability. Some of these munitions can be dropped from higher altitudes with greater accuracy than conventional gravity bombs, and some can be launched from outside the effective range of enemy defenses. An Air Force-sponsored analysis of JDAM operational effectiveness, for example, shows that the use of the munition could result in a decrease of 16 to 20 percent of aircraft lost to enemy fire. It is also expected to allow each aircraft to accurately attack a greater number of targets during each sortie. The increased standoff capability provided by the WCMD and the JSOW are also expected to enable fighters and bombers to hit targets more effectively and thereby increase aircraft survivability. WCMD provides increased high-altitude accuracy and the capability for all-weather operations and independent targeting. The JSOW is likewise expected to be effectively launched outside enemy point defenses during day or night and in adverse weather conditions.

The services consider precision-guided munitions the asset they need to offset the reduced force structure and to sustain their lethal capability. DOD's bottom-up review emphasized that precision-guided munitions are one of the improvements needed to ensure that U.S. forces can operate successfully in future MRCs. However, the services' future force structure plans do not indicate that they expect the increased use of these munitions to reduce force structure any more than that cited in the review.

⁷Weapons Acquisition: Precision Guided Munitions in Inventory, Production, and Development (GAO/NSIAD-96-95, June 1995).

Precision-Guided Munitions to
Improve All Services'
Interdiction Capabilities

Precision-Guided Munitions
Offer a Unique Capability With
Force Structure Implications

Our analysis of the Air Force and the Navy munitions requirements shows that, by 2002, the two services expect to reduce the number of sorties flown during two MRCs by about 28 percent. Most of this reduction is attributable to precision-guided munitions, which can correct errors in flight, resulting in the same or higher levels of success as could be achieved with larger numbers of unguided weapons. In addition, the services expect precision-guided munitions' accuracy and lethality to increase aircraft survivability. For example, as cited above, the number of aircraft lost to enemy fire could decrease by up to 20 percent with use of the JDAM. According to the analysis, aircraft are less vulnerable to enemy air defense when using JDAM than when using other weapons like the GBU-24, AGM-130, or AGM-65G (Maverick). Moreover, JSOW is expected to hit several targets with its multiple submunitions; consequently, the services would need to fly fewer sorties to hit the desired number of targets. Therefore, in addition to ensuring the adequacy of the current force to meet warfighting needs, further reductions in sorties appear to raise the possibility that the number of aircraft to be modernized, purchased, or retained in the force could be reduced.

Conclusion

While modernization may be vital to preserving U.S. forces' edge and ensuring future readiness, modernizing or buying capability that adds little or unknown value to the interdiction mission and costs more than \$213 billion may not be a sound investment. The upgrade to the B-1B and the purchase of additional F/A-18E/Fs, Apache and Comanche helicopters, and precision-guided munitions constitute a significant investment. Some of these modernization programs may be worth the cost if they materially strengthen interdiction capabilities, but until DOD's decision processes give sufficient attention to interdiction capabilities in the aggregate, there can be little assurance that the appropriate, most cost-effective mix of weapon systems is being identified, developed, and fielded for interdiction missions. If they do materially improve capabilities, then, as suggested in the Defense Planning Guidance, their acquisition may also allow DOD to consider reductions elsewhere in the force. The need for such an assessment has been borne out by the Commission and our analysis of the services' interdiction capabilities and proposed modernization.

Recommendation

We recommend that the Secretary of Defense routinely review service modernization proposals based on how they will increase the current aggregate ability of the U.S. military to perform the interdiction mission. Such a process should prioritize funding for those capabilities that

contribute most to meeting the joint operation requirements and assist in determining the appropriate mix and quantities of interdiction capabilities. Moreover, proposals that add redundancy—such as the B-1B and Apache modifications and the purchase of F/A-18E/Fs, ATACMS, attack helicopters, and precision-guided missiles—should be examined in the context of the additional interdiction capability they offer as well as the contributions they make to other mission areas. This analysis could serve as the basis for deciding funding priorities, the sufficiency of investment, and the future force structure. We recognize that some weapon systems are multimission and this recommended assessment should consider the potential contribution to those other missions.

Agency Comments and Our Evaluation

DOD agreed with our recommendation that the Secretary of Defense routinely review service modernization proposals based on how they would enhance the current aggregate capability of the U.S. military to perform the interdiction mission. It further agreed that assessing total capabilities offers opportunities to seek alternatives when modernizing. DOD acknowledged that there are problems regarding joint-service planning and agreed that it needs to modify its requirements determination process to assess modernization proposals in terms of threat, adequacy of current aggregate capabilities, and the contributions of the proposed modernization to this aggregate capability. However, DOD said that (1) it could best accomplish this goal by making changes to its existing process, rather than creating an entirely new process and (2) it was already acting on some of the criticisms of its joint-service planning. On this latter point, DOD cited its deep attack weapons mix study, whose first phase results are due in the summer of 1996.

Our intention was not to suggest an entirely new and separate process to conduct the envisioned assessments. Rather, our intent is that DOD's process incorporate the necessary analysis to assess the aggregate capabilities of the services to perform interdiction before deciding on the need for force modernization.

DOD disagreed with our finding that it plans more interdiction capability at high cost despite the fact that it has ample forces to meet current and future interdiction needs. DOD asserted that its planned acquisitions are necessary to keep its modernization program proactive rather than reactive. In making this point, it said that the portion of the acquisition budget devoted to interdiction-capable assets is not excessive given their multirole capabilities.

Chapter 3
An Assessment of Aggregate Interdiction
Capabilities Yields Alternatives to Proposed
Modernization

We acknowledge the multiple roles that some interdiction assets are expected to perform and agree that their contributions to other missions must be considered in performing the broad assessments that we recommend. However, DOD officials and external experts have achieved a consensus that current interdiction capabilities are already adequate. For example, the most recent Chairman of the Joint Chiefs program assessment points out that tactical aircraft procurement plans call for more resources than may be forthcoming. Accordingly, he recommended that the services identify programs that could be slowed or terminated. The deep attack weapons mix study that DOD cites is in fact being done to identify how plans can be modified to achieve such savings.

Given the high cost of planned upgrades and questions about whether funding will be forthcoming to cover all of them, DOD is likely to be faced with difficult trade-off decisions on which enhancements it can pursue. The broad assessments of aggregate capabilities that we recommend compared to the contribution of planned upgrades to this capability should assist the Secretary in making these difficult choices.

DOD partially concurred with other issues discussed in the report. We considered its comments, which appear in appendix III.

U.S. Military Interdiction Platforms' and Weapons' Current and Future Capabilities

Weapons	Air Force				
	A-10	F-16	F-111	F-15E	B-52
Mark 82	X	X	X	X	
Mark 84	X	X	X	X	X
Mark 83					
M-117					X
Mk 20	X	X	X	X	
Rockeye					
CBU-58			X	X	X
CBU-87 (CEM)	X	X	X	X	
CBU-97 (SFW)	X	X		X	
GBU-10		X	X	X	
GBU-12		X		X	
GBU-15			X	X	
GBU-24		X	X	X	
GBU-27					
GBU-28			X		
AGM-65	X	X		X	
AGM-130			X	X	
AGM-142					X
JDAM		X		X	X
JSOW		X			
CALCM					X
MAVERICK		X			X
WCMD		X		X	X
LGB					
SLAM-ER					
Walleye					
TLAM					
ATACMS-B1					
ATACMS-B1A					
ATACMS-B2					
ATACMS-B2/BAT P31					

Precision-Guided Munitions

Dollars in millions		
Munition	Total acquisition cost ^a	Quantity ^a
AGM-130	\$ 647.47 ^b	502
AGM-142	200.70	130
CALCM	^c	^c
GBU-10	271.34 ^d	11,329
GBU-12	620.23 ^d	32,636
GBU-15	774.50	2,823
GBU-24	729.14 ^d	13,114
GBU-27	176.72 ^d	3,213
GBU-28	18.20	125
JDAM	4,650.60	74,000
JDAM PIP	76.50 ^e	5,000 ^e
JSOW/Baseline	3,327.60	11,800
JSOW/BLU-108	2,033.50	4,200
JSOW/Unitary	5,608.30	7,800
Longbow Hellfire	2,158.00 ^f	13,311 ^f
Maverick, Air Force	3,063.50	23,689
Maverick, Navy	653.00	4,115
GBU-97(SFW)	1,827.10	5,000
SLAM	1,138.80	767
SLAM-ER	550.30	700 ^g
TLAM	8,426.80	3,405
TLAM Baseline Improvement Program	2,578.60	1,181 ^g
Walleye	372.00	3,200
WCMD	^c	40,000 ^h
Total	\$ 39,902.90	260,859

(Table notes on next page)

Appendix II
Precision-Guided Munitions

^aWeapons Acquisition: Precision Guided Munitions in Inventory, Production, and Development (GAO/NSIAD-95-95, June 1995).

^bAcquisition cost for the AGM-130C includes development cost only.

^cCost information and quantity are classified.

^dCost includes only production; development cost was not available.

^eThe Air Force did not provide complete costs for the JDAM product improvement because the seeker technology has not been decided. However, the Air Force has programmed \$76.5 million through fiscal year 2001 for the program. Also, quantities for the product improvement are not included in the total because 5,000 of the baseline JDAMs will be equipped with the terminal seeker.

^fData supplied by the U.S. Army.

^gQuantities for the SLAM-ER and TBIP are not included in the total because these munitions are improvements and remanufactures of existing SLAMs and TLAMs.

^hData supplied by the U.S. Air Force.

Comments From the Department of Defense



ACQUISITION AND
TECHNOLOGY

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06 FEB 1996

Mr. Richard Davis
Director, National Security Analysis
National Security and International
Affairs Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Davis:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "COMBAT AIR POWER: REASSESSING PLANS TO MODERNIZE INTERDICTION CAPABILITIES COULD SAVE BILLIONS," dated December 22, 1995 (GAO code 701039), OSD Case 1075. The Department partially concurs with the report. The DoD agrees that Service modernization proposals require periodic reviews to insure that aggregate interdiction capabilities are maintained in the most cost-effective manner while meeting the needs of the operational commanders. However, the Department does not believe the Secretary of Defense needs to initiate another process for reviewing Service modernization proposals. Instead, the DoD believes that periodic reviews are best implemented by making changes to our existing processes. In fact, an evolution of these existing processes is already underway.

In our current fiscal environment, life-cycle costs are considered when assessing any new defense system, as well as how that system fits with our aggregate joint warfighting strategy. The Chairman of the Joint Chiefs of Staff, with the assistance of the Vice Chairman, who chairs the Joint Requirements Oversight Council, conducts requirements analyses, determines the validity of mission needs and develops recommended joint priorities for those needs it approves, and validates performance objectives and thresholds, often including cost requirements, in support of the Defense Acquisition Board. Additionally, the Combatant Commanders provide annual inputs to the Chairman stating their specific warfighting priorities. This interdiction redundancy, allowed in many cases by the multi-mission capability of our systems, is a necessary part of our ability to respond to a crisis in a timely manner while insuring our combat resources are utilized in the most effective way possible. All the Service Chiefs, in preparing their annual budget proposals, view their priorities with the primary emphasis of how systems will complement the joint warfighter's needs, while ensuring their ability to respond to a myriad of contingency operations.



Appendix III
Comments From the Department of Defense

How is this process evolving? We are actively reviewing our requirements to identify unnecessary or overly redundant capabilities through such mechanisms as the Joint Warfighting Capability Assessment process. In addition, Phase II of the Deep Attack/Weapons Mix Study, which followed the FY95 Heavy Bomber Study, is due to be completed this summer and will help us define where we can make cost-saving reductions while maintaining our flexibility and capabilities.

Detailed DoD comments are provided in the enclosure. The Department appreciates the opportunity to comment on the draft report.

Sincerely,



George R. Schneiter
Director
Strategic and Tactical Systems

Enclosure

GAO DRAFT REPORT - DATED DECEMBER 22, 1995
(GAO CODE 701039) OSD CASE 1075

**"COMBAT AIR POWER: REASSESSING PLANS TO MODERNIZE
INTERDICTION CAPABILITIES COULD SAVE BILLIONS"**

DEPARTMENT OF DEFENSE COMMENTS

FINDINGS

FINDING A: The Services Have Abundant Interdiction Capabilities, Yet Plan to Add More. The GAO concluded that the DoD currently has aggregate forces capable of hitting interdiction targets in numerous overlapping, often redundant ways during two major regional conflicts. The GAO found that the DoD has designated at least 10 ways to hit over 65 percent of the total expected ground targets, and some targets could be hit by 25 or more combinations of aircraft, missiles, bombs, or precision-guided munitions. The GAO also observed that, although the Commission on Roles and Missions concluded the U.S. may already have more than enough interdiction capabilities, the Services' modernization plans would increase to over 85 percent the number of targets that could be hit 10 or more ways.

The GAO acknowledged that combat air power is expected to remain the primary interdiction force, as it was during the Persian Gulf War. The GAO concluded, however, that the forces available today exceed significantly those used during the Gulf War. The GAO also asserted that other weapons that could contribute to the mission—e.g., the Navy Tomahawk Land Attack Missile (TLAM), the Army Apache and Comanche helicopters, the Army Tactical Missile System (ATACMS), and all of the Service precision-guided munitions—are increasingly available. The GAO also concluded that the Services' responsibilities for hitting targets overlap and exceed 100 percent. For example, to interdict 80 percent of one target type, the GAO observed that one Commander in Chief allocated a portion to each Service that in total ranged from 105 to 140 percent of that target. Further, the GAO found that the Services have multiple ways to hit the same target, and noted that one target type can currently be hit with 21 combinations featuring 6 different aircraft, one type of missile launcher, and 10 types of munitions. The GAO also asserted that the number of options in the example is not unusual, and that some targets can be hit by at least 25 combinations. (pp. 3-4, pp. 15-19/GAO Draft Report).

Now on pp. 5-6 and
23-27.

page 1 of 6

DOD RESPONSE: Partially concur. The DoD agrees that it appears as if the Services have an abundant interdiction capability. However, these capabilities must be studied in broader terms than just their contribution to our interdiction capabilities. Specifically, the aggregate interdiction assets need to be studied in terms of flexibility, multi-mission capability, and availability.

The warfighting commanders must be able to rely on their interdiction assets to respond under any weather condition, over variable distances, and, in some cases, under severe time constraints. Additionally, in today's warfare environment, precision-guided weapons are the operational commander's weapons of choice for almost all targets. For example, a warfighting commander may desire the ability to kill a tank in the best way under all possible conditions. One weapon system may not be able to accomplish this goal under all these conditions. To meet that goal requires several, seemingly redundant, systems. These multiple responses offer the warfighting commander operational flexibility, though on the surface they appear redundant and unnecessary. As another example, a generic target may be attacked by both ATACMS and the B-1, but this presumes that both will always be in theater and in range for those capabilities to be truly "redundant."

Many interdiction assets have multi-mission capability. For example, most Air Force interdiction assets also perform other vital missions as well (e.g., close air support, suppression of enemy air defenses, counter-air, and strategic attack). Some of these aircraft are also the only DoD platforms assigned to employ air-delivered nuclear weapons. As another example, the Army Comanche helicopter's primary mission is reconnaissance and security, not interdiction. Thus, the interdiction assets, and the plan to add more, must be considered in the context of the complete warfighting system.

Because many of the interdiction assets have multiple missions, the warfighting commanders cannot hope to rely on the entire suite of the assets for interdiction purposes—many of the assets will simply not be available. Again, the apparent level of redundancies and overlap need to be studied in the context of the entire system.

In a separate vein, this finding overstates existing platform capability by more than double-counting available interdiction assets. For example, an F/A-18 dropping a MK82, MK83, or MK84 bomb on a given target may be counted as three separate ways to destroy a target. After factoring all the possible weapons that an F/A-18 might employ against a given target, adding up the number of different ways to hit a given target quickly mounts—even though only a single aircraft is involved. In addition, weapon selection is largely determined by target characteristics. Against a soft target, the F/A-18 may have a choice of weapons to meet the objective. If the target is hardened, however, the same aircraft may have only one munition capable of achieving target destruction.

Lastly, today's interdiction forces exceed those used during the Persian Gulf War because the Persian Gulf War represented a single Major Regional Contingency (MRC), whereas the Services' interdiction assets are geared for two MRCs.

FINDING B: The Services Plan to Add More Interdiction Capability at High Cost.

Despite the fact that the Services have ample forces to meet current and future interdiction missions, the GAO found that the DoD plans to add even more capability by modernizing some weapons and buying more of others over the next 20 years, at a cost of \$212 billion. Moreover, the GAO asserted that this cost does not include over \$72 billion for the F-22 or the cost of the Joint Attack Strike Technology (JAST) aircraft, which will affect the budget to the year 2010 and later. The GAO observed that five of the programs will cost an estimated \$196 billion dollars over the next 20 years—i.e., the Air Force modification of the B-1B for conventional use; the Navy purchase of 1,000 F/A-18E/F aircraft; the Army upgrade of about 750 Apache helicopters and the purchase of about 1,300 Comanche helicopters and 2,800 ATACMS; and the purchase of 260,000 precision-guided munitions by all of the Services. (p. 4, pp. 6-8, pp. 20-21/GAO Draft Report).

DOD RESPONSE: Nonconcur. Additional warfighting asset acquisitions are necessary so that the DoD's modernization program remains proactive rather than reactive. As stated in the DoD response to Finding A, the referenced acquisitions enhance many mission areas in addition to interdiction. The Department does not believe the portion of the acquisition dollars spent on interdiction-capable assets is excessive given their multi-role capabilities. For example, it would not be appropriate to count the entire cost of the Army Comanche helicopter as an interdiction cost, because the Comanche's primary mission is reconnaissance. As another example, regarding the conventional upgrade to the B-1B, the GAO cost of \$3.9 billion appears to include Operations & Maintenance items beyond the specific money required for the B-1B Conventional Mission Upgrade Program (CMUP). More correctly, the programmed cost for B-1B CMUP is \$2.4 billion and represents an upgrade to a multi-mission platform.

The GAO also does not appropriately compare the cost of the F/A-18E/F to the F/A-18C/D. The stated cost of \$83 million for each F/A-18E/F refers to the average unit procurement cost for the aircraft and encompasses total flyaway cost (recurring, non-recurring, and ancillary equipment), weapon system costs, and spares. This is total cost over the life of the program from 1992 to 2014 in then-year dollars (as compared to the F/A-18 A/B/C/D program from 1979 to 1996 in then-year dollars). The comparison of this cost with the approximate \$48 million unit cost of the F/A-18C/D is not an appropriate comparison. A more accurate cost comparison would be the recurring flyaway cost of each aircraft in FY96 dollars. In these terms,

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Now on pp. 6-9 and
27-28.

the F/A-18C/D cost is \$34.7 million as compared to the F/A-18E/F cost of \$43.6 million. This is a 25.7 percent increase for the F/A-18E/F, which conforms to congressional guidance that the F/A-18E/F should not exceed 125 percent of the fly-away cost of the F/A-18C/D, normalized for production rate and inflation. This capability increase is cost-effective when one considers the significant improvements in range, payload, and survivability that the F/A-18E/F maintains over the F/A-18C/D. Also, the F/A-18 C/D/E/F represent multi-mission platforms, not just interdiction assets.

FINDING C: Assessment of Total Capabilities Offers Opportunity to Seek Alternatives to Modernization Programs. The GAO concluded, along with the Commission on Roles and Missions, that the environment in which the Services develop modernization plans does not encourage them to take into account the aggregate capabilities available in the other Services. Rather, the GAO found that each Service maintains a parochial view about how it can ensure that its interdiction targets are hit. For example, the GAO reported in 1993 (OSD Case 9140-A/GAO Code 394476) that the Navy had not justified the need for the F/A-18E/F aircraft based on the threat and had not explored options other than Navy fixed-wing aircraft. In addition, the GAO noted that the Joint Chiefs of Staff established the Joint Requirements Oversight Council (JROC) to assess Service modernization initiatives, recognizing the need for oversight in developing requirements. To date, however, the GAO found that the JROC has not focused on the possibility of making trade-offs between major weapons. The GAO also observed that the Commission on Roles and Missions recently recommended that the DoD do a cost-effectiveness study to determine the appropriate combination and quantities of attack capabilities in its current inventory as well as those under development by all the Services. The GAO indicated that the study is expected to be completed by March 1996.

The GAO concluded that, given that defense spending has been constrained, the threat to U.S. security has recently lessened and will remain the same for the foreseeable future, and the Services have ample interdiction capability, some of the Services' modernization proposals may not be a wise investment. For example, the GAO asserted that the Air Force planned upgrade to the B-1B bomber and the Navy F/A-18E/F procurement appear to add more redundancy at high cost. In addition, the GAO asserted it is uncertain what value the Army ATACMS and Apache Longbow and Comanche helicopters, and the Services' thousands of precision-guided munitions will add to interdiction capabilities. Although the GAO noted that the joint warfighting capability assessment (JWCA) has led to more systematic and extensive discussions among the top military leadership about joint issues, and some headway has been made on issues such as interoperability of command and control systems, the process has yet to make major force structure proposals to minimize overlap and duplication. The GAO also found that in-depth analyses of major weapon systems and cross-Service issues have not been done to make force

Now on pp. 7-9 and
31-46.

mix decisions and trade-offs that could save billions of dollars. Consequently, the GAO concluded that the JWCA process has not addressed or provided the ability to determine the relative priorities of the missions and what the balance of funding among them should be. (pp. 5-8, pp. 23-37/GAO Draft Report).

DOD RESPONSE: Partially concur. The Department agrees that assessing total capabilities offers opportunities to seek alternatives when modernizing. Capabilities-based planning is very difficult—a fact that the Department fully recognizes. The Department has acknowledged problems with joint-Service planning and is already acting on some of those criticisms. The Deep Attack/Weapons Mix Study (DAWMS) is a case in point. The results from the DAWMS Phase II are not expected until the summer of 1996.

The Department already has several fora in place that contribute to this function, one being the JROC as mentioned in the report. Others include the Services, the warfighting commanders, the Defense Resources Board, and the Defense Acquisition Board. Each of these fora provides a unique contribution in the prioritization process. Also, the JAST Program is a joint program where the requirements for the aircraft are being developed in an environment that considers the contribution of current and planned weapons and assesses capability shortfalls that the JAST aircraft must meet.

RECOMMENDATIONS

RECOMMENDATION 1: The GAO recommended that the Secretary of Defense initiate a routine process for reviewing Service modernization proposals based on how they will enhance the current aggregate ability of the U.S. military to perform the interdiction mission. (p. 8, p. 37/GAO Draft Report).

DOD RESPONSE: Concur. The Department of Defense already has an established process for reviewing Service modernization proposals; therefore, the Secretary does not need to initiate a new process. The Joint Requirements Oversight Council (JROC), chaired by the Vice Chairman of the Joint Chiefs of Staff, conducts requirements analyses, determines the validity of mission needs, develops recommended joint priorities for those needs it approves, and validates performance objectives and thresholds in support of the Defense Acquisition Board (DAB). The DAB, chaired by the Under Secretary of Defense for Acquisition and Technology and vice-chaired by the Vice Chairman of the Joint Chiefs of Staff, reviews program readiness to proceed to the next milestone and ensures that it is adequately funded. The Defense Resources Board balances Secretary of Defense priorities with available funding resources. This process is evolving to insure defense funds are spent in a cost-effective manner and the needs of the warfighters are properly supported.

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RECOMMENDATION 2: The GAO also recommended that such a process should prioritize funding for those capabilities that contribute most to meeting the joint operation requirements within budget constraints and assist in determining the appropriate mix and quantities of interdiction capabilities. (p. 8, p. 37/GAO Draft Report)

DOD RESPONSE: Partially concur. The Services each prioritize their programs within funding constraints to insure that those requirements that are necessary to meet stated warfighting needs are fully funded. Once the Service budgets are submitted to the Office of the Secretary of Defense (OSD), a further review is conducted to insure the operational commanders' needs are being met. The JROC assists the OSD review process by acting as the spokesman for the operational commanders.

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RECOMMENDATION 3: The GAO further recommended that proposals that add redundancy—such as the B-1B and Apache modifications and the purchase of F/A-18E/Fs, ATACMS, attack helicopters, and precision-guided munitions—should be examined in the context of the additional interdiction capability they offer. The GAO asserted that the analysis could serve as the basis for deciding funding priorities, the sufficiency of investment, and the future force structure. (p. 8, p. 37/GAO Draft Report)

DOD RESPONSE: Partially concur. The Chairman's Program Assessment summarizes his and the operational commanders' views annually on the balance and capabilities of the Program Objective Memorandum force and the support levels to attain national security objectives. This input to the Secretary of Defense and the results of JROC decisions aids in deciding funding priorities, sufficiency of investment, and the future force structure. The Department of Defense continues to reevaluate its force structure mix. An example is the Deep Attack/Weapons Mix Study, a follow-on to the FY95 Heavy Bomber Study, to help define the proper mix of capabilities to adequately meet future warfighting requirements. Phase II of that report is due out the summer of 1996.

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