

GAO

Report to the Chairman, Committee on  
Armed Services, House of  
Representatives

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September 1993

SUPPRESSION OF  
ENEMY AIR DEFENSES

Air Force Plans



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United States  
General Accounting Office  
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National Security and  
International Affairs Division

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The Honorable Ronald V. Dellums  
Chairman, Committee on Armed Services  
House of Representatives

Dear Mr. Chairman:

In response to the Committee's interest in the Department of Defense's (DOD) efforts to develop and procure future Suppression of Enemy Air Defenses (SEAD) systems, we assessed the Air Force's plans for the SEAD mission as one of its primary SEAD aircraft, the F-4G "Wild Weasel," retires toward the end of the century. Specifically, our objectives were to assess (1) current and future enemy air defense threats and (2) the capabilities of the alternatives the Air Force is considering for future SEAD. This report focuses on the Air Force's efforts to accommodate the retirement of the F-4G SEAD aircraft.

## Results in Brief

U.S. conventional combat aircraft would face increased risk in future conflicts if the Air Force proceeds with its plans for future SEAD aircraft. By the turn of the century, the Air Force will retire the aging F-4G "Wild Weasel" SEAD aircraft and eliminate dedicated SEAD units. The Air Force expects to assign the SEAD mission, as an added task, to units flying F-15 and F-16 aircraft and to equip them with SEAD systems that are less capable than current systems. In August 1992, Office of the Secretary of Defense (OSD) officials acknowledged to congressional staff that the Air Force's plans for SEAD involve some risk because there will be a time gap between the retirement of the F-4G and the fielding of the new SEAD systems in numbers sufficient to offset decreases in the capabilities of the new systems. Subsequently, in March 1993, the Air Force decided to field fewer SEAD-equipped aircraft with potentially even less capability, which would further increase risk.

The Defense Intelligence Agency (DIA) and the Air Force have identified a continued need for SEAD. DIA recently reported that U.S. conventional combat aircraft would continue to face significant threats that will require suppression to minimize their losses. Air Force threat assessments supporting the need for future SEAD equipment have reached similar conclusions. The Air Force's plans to accomplish SEAD are budget rather than threat driven. According to Air Force officials, future reduced budgets and force structure are driving the decision to eliminate single

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mission units such as the F-4G SEAD force because they compete for funding with the Air Force's high priority F-22 and B-2 programs.

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## Background

The goal of SEAD is to establish an environment that allows friendly aircraft to attack in the safest, most effective manner. SEAD entails neutralizing, destroying, or temporarily degrading enemy integrated air defense command, control, communications, and radar systems that are directing surface-to-air missiles and antiair artillery against friendly aircraft. SEAD reduces friendly aircraft losses and allows aircraft to operate effectively.

SEAD may be accomplished by lethal and nonlethal means. Lethal SEAD physically destroys or incapacitates crucial parts of the air defense system such as radar antennae and communications links. Nonlethal SEAD electronically jams (or interferes with) these systems to temporarily degrade their effectiveness.

DOD tasks all the armed services to provide SEAD using a variety of weapon systems such as artillery, ground-to-ground missiles, cruise missiles, helicopters, and attack aircraft using general purpose munitions. Some weapon systems were specifically designed for SEAD, including the Air Force's F-4G "Wild Weasel" and EF-111 "Raven" and the Navy's and Marine Corps' EA-6B "Prowler." The F-4G provides lethal suppression, the EF-111 provides nonlethal suppression, and the EA-6B provides both. The jointly used High Speed Antiradiation Missile (HARM), designed to attack emitting radar, is the services' munition of choice for lethal SEAD.

These systems were employed extensively in the Gulf War with the Air Force using virtually all available F-4Gs. DOD and Congressional Gulf War studies highlighted the importance of the SEAD mission. They concluded that the services' SEAD aircraft were effective in shutting down Iraqi radar systems allowing coalition aircraft to attack their targets in the safest and most effective manner while minimizing friendly aircraft casualties.

According to Air Force officials, the F-4G "Wild Weasel" continues to fly in the Gulf region. F-4Gs are flying to protect U. N. patrols in the north and south "no-fly" zones in Iraq. About half of the available F-4G force is deployed to the Gulf region.

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## U.S. Tactical Aircraft Will Remain Vulnerable to Enemy Air Defense Threats

U.S. attack aircraft will remain vulnerable to enemy air defenses into the next century because of (1) the increased dispersion and sophistication of the defenses and (2) the conventional, nonstealthy characteristics of the attack aircraft force. At DOD's request, DIA assessed threats to U.S. fixed-wing tactical aircraft in the 2000 to 2005 time frame. This assessment, completed in February 1993, concluded that U.S. conventional aircraft would face enemy air defense threats equal to or surpassing the current threat and will require suppression to minimize losses. In discussing the report, DIA officials noted that the United States will continue to face systems and technologies developed by the former Soviet Union, Western Europe, and even the United States that are sold to potential regional adversaries.

Documentation supporting development programs for new Air Force SEAD systems and stealthy aircraft, as well as discussions with the Joint Chiefs of Staff, OSD and service officials support DIA's conclusions. For example, to justify the stealthy F-22 Advanced Tactical Fighter program before the Congress in March 1992, the Secretary of the Air Force noted that ". . . Although the Soviet threat has declined, its advanced technology, high-performance aircraft and anti-air defense systems are rapidly being disbursed around the globe. This proliferation can challenge our presence throughout the world . . ."

Air Force and DOD reports on the Gulf War concluded that U.S. stealthy attack aircraft reduced vulnerability to enemy air defense. Until 2005, the vast majority of U.S. attack aircraft will be conventional nonstealthy aircraft. The only stealthy attack aircraft available in 2005 will be the same number of Air Force F-117s currently available, which comprised only about 4 percent of the Gulf War attack force. The services have no plans to increase the number of stealthy air interdiction aircraft until about 2005.

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## The Air Force's Current Lethal SEAD Aircraft Is Near the End of Its Useful Life

According to DOD and Air Force officials, the F-4G force is near the end of its useful life and needs to be retired. The aging two-seat F-4G equipped with the APR-47 radar receiver is the Air Force's primary lethal SEAD weapon system. The APR-47 is key to effective lethal SEAD because it gives the aircraft the capability (1) to detect, classify, and localize enemy air defense radars and (2) to quickly pass target range, bearing and enemy system information to HARM. The APR-47 is the only radar receiver currently available that can automatically provide HARM with both bearing and ranging information, a factor that significantly increases the HARM's effectiveness.

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Even though the average age of F-4G aircraft is about 24 years, the Air Force extended F-4G's 1993 retirement date toward the end of the century because there will be no system available to assume the lethal SEAD mission until that time. In fiscal year 1989, the Air Force had 72 F-4Gs in active units and by the end of fiscal year 1993, only 42 will remain in 2 squadrons—1 active unit and 1 Air National Guard unit. By the turn of the century, the Air Force expects to have retired all F-4Gs from service and will have eliminated dedicated lethal SEAD units in favor of adding SEAD as an additional task for F-15 and F-16 units.

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## Air Force Alternatives for Future SEAD Systems Are Less Capable

Since 1989, the Air Force has changed directions twice in considering future lethal SEAD systems to assume the mission as the F-4G retires. The most recent plans would result in the Air Force trying to accomplish the SEAD mission with a less capable system than the F-4G.

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### Initial Plan to Replace F-4G Considered Unaffordable

In fiscal year 1982, the Air Force began considering the need for a follow-on Wild Weasel aircraft to replace the aging F-4G in the SEAD role. In 1986, the Air Force contracted with McDonnell Aircraft Company and General Dynamics to study how SEAD capabilities could be built into the F-15 and F-16, respectively. In July 1987, these companies proposed modifications to the two-seat F-15E and the two-seat F-16. Both proposals incorporated the APR-47 into the aircraft, maintaining, at a minimum, current capabilities. In discussing these proposals, Air Force officials noted that a single-seat aircraft could not accommodate the APR-47.

In 1988, the Air Force included these proposals in another analysis of a potential follow-on to the Wild Weasel and suggested that fiscal year 1990 funds be made available to start such an acquisition program. For this analysis, the Air Force required that, at a minimum, the follow on would maintain the capabilities of the F-4G's APR-47. The Air Force studied modifying various aircraft and reviewed radar receiver technology and concluded that a modified two-seat F-15 would best meet requirements.

However, on December 11, 1989, the Air Force decided to cancel the follow-on effort even though it had plans to retire the F-4G in 1993. According to Air Force headquarters and Air Combat Command officials (formerly Tactical Air Command), this decision was based on expected budgetary constraints. They stated that the Air Force could no longer afford to develop and support single mission aircraft that would be in

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direct competition with such Air Force priorities as the F-22 stealthy fighter and the B-2 stealthy bomber. The Wild Weasel mission would have to be absorbed by F-15E and F-16 aircraft modified with less capable SEAD equipment.

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### Current Air Force Plans Will Not Match Current SEAD Capabilities

In January 1990, the Air Force Chief of Staff tasked the Air Combat Command and the Air Systems Division with developing a plan to meet near-term (3 to 5 years) and long-term (6 to 15 years) SEAD needs. Near-term efforts were to concentrate on developing limited SEAD capabilities for F-15E and F-16 aircraft. Long-term efforts were to concentrate on new approaches to SEAD that at a minimum would lead to the development of a target location and attack system that meets projected threats in 2005 and that exceeds current F-4G SEAD system performance.

The Air Combat Command and the Air Systems Division responded with a three-phased approach, but none of the systems envisioned in any phase would be as capable as the F-4G system. In the first phase, currently underway, the Air Force is developing and procuring an interim HARM Targeting System that will provide limited SEAD capability for the single-seat F-16. This phase was intended to provide limited SEAD with these F-16s during the expected gap between the 1993 F-4G retirement and fielding the long-term solution.

In fiscal year 1992, the Air Force began the second phase—developing an internal HARM targeting capability for the two-seat F-15E called the precision direction finder (PDF). The unfunded third phase was to develop a variant of PDF for the F-16.

The cost and operational effectiveness analysis supporting milestone I acquisition decisions for the PDF program (completed in March 1992) established a baseline well below the capabilities of the F-4G. SEAD options were compared to this baseline. DOD acquisition regulations state that the baseline is generally the current capability. However, the Air Force omitted its most capable SEAD system, the F-4G, and used instead an F-16 firing HARMS without SEAD electronic equipment as the baseline. The Air Force uses the F-16 to fire HARMS only when accompanied and directed by an F-4G. The cost and operational effectiveness analysis indicated that the F-15E PDF system was the most cost-effective option compared to the baseline. But the analysis is misleading because it does not provide any indication of how this system would perform in comparison to the F-4G.

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According to Air Force officials, neither the F-15E nor F-16 PDF would be as capable as the current F-4G.

In an August 1992 briefing to congressional staff, OSD electronic warfare officials acknowledged the Air Force position that the PDF system was not as capable as the current system. They also noted that degradation in technical capability would be offset by increased numbers of aircraft available for the mission. However, they concluded that the PDF concept would result in some risk through 2000 because there will be a time gap between the F-4G's retirement and the fielding of sufficient numbers of new SEAD systems to compensate for the degraded capability.

In March 1993, the Air Force terminated the F-15E PDF program. Air Force officials expressed concerns that the number of F-15E aircraft are not sufficient to assume the SEAD mission. Instead, single-seat F-15Cs are to be modified with a PDF-like system for SEAD. The Air Force also reduced the SEAD program budget by 50 percent through the 5-year defense plan.

According to Air Force officials, the reduced budget will lead to a system that does not meet the operational requirements established for the F-15E PDF system and will result in the fielding of fewer aircraft than was planned for the F-15E PDF. Also, Air Force officials have concerns about increasing the pilot work load for the single-seat F-15C.

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## Recommendation

We recommend that the Secretary of Defense reevaluate funding priorities in light of the increased risk associated with reducing SEAD capabilities.

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## Agency Comments and Our Evaluation

DOD generally concurred with the report but took exception to our description of OSD's August 1992 congressional briefing concerning risk associated with the PDF concept. OSD stated that the risk involved with the PDF concept is the time gap between the F-4G retirement and the initial operational capability of the PDF equipment and not risk to the attack force. We clarified OSD's position concerning risk in the report.

DOD concurred with our recommendation. DOD commented that although the recommendation was too broad in scope, DOD will specifically address the reduction in SEAD capabilities (i.e., F-4G capability) by requesting the Air Force to update the cost and operational effectiveness analysis using the F-4G with the APR-47 as the baseline by the end of fiscal year 1994. We

recognize that the recommendation is broad in scope, but we believe that it would allow DOD maximum flexibility in addressing this issue.

## Scope and Methodology

To accomplish our objectives, we reviewed DOD's acquisitions regulations and the Air Force's requirements documents to analyze the methodology used to select the replacement for the F-4G. We interviewed Air Force officials to determine (1) strengths and weaknesses of options considered for F-4G replacement and (2) how the service plan to conduct SEAD in the future versus how it is conducted today. We also interviewed intelligence and tactical warfare personnel to identify factors relevant to future SEAD roles and missions.

We performed our work at the Air Combat Command (formerly Tactical Air Command), Langley Air Force Base, Virginia; DIA, Bolling Air Force Base, Maryland; the Joint Chiefs of Staff, OSD, the Air Force and Navy Headquarters, Washington D.C.; the Naval Strike Warfare Center, Eglin Air Force Base, Florida; the Marine Electronic Warfare Squadron Three, Marine Air Station, Cherry Point, North Carolina; the National Guard Bureau, Andrews Air Force Base, Maryland; the Air National Guard, Boise, Idaho; and the 366th Wing and the 429th Electronic Combat Squadron, Mountain Home Air Force Base, Idaho.

We conducted our work between March 1992 and June 1993 in accordance with generally accepted government auditing standards.

This report was prepared under the direction of Richard Davis, Director, National Security and Analysis, who may be reached on (202) 512-3504 if you or your staff have any questions. Major contributors to this report are listed in appendix I.

Sincerely yours,



Frank C. Conahan  
Assistant Comptroller General

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