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November [redacted]

ELECTRONIC WARFARE

Costly Radar Warning Receiver Duplication Continues

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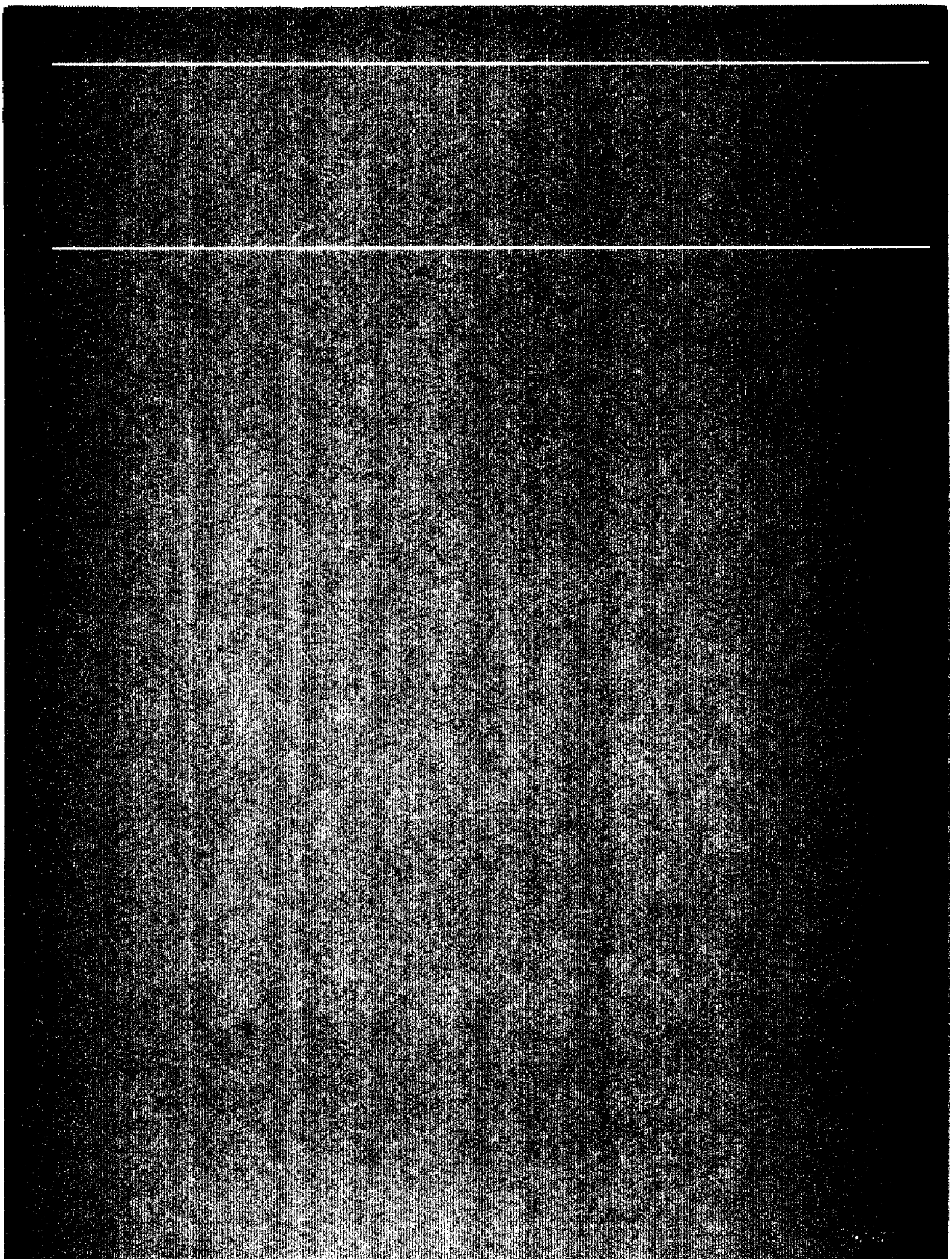

GAO

United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

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November 29, 1993

The Honorable John Conyers, Jr.
Chairman, Legislation and National
Security Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

At your request, we have assessed the progress the military services have made in attaining radar warning receiver commonality since the Subcommittee's 1987 hearing on the subject. This report contains recommendations to the Secretary of Defense and matters for congressional consideration.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from its issue date. At that time, we will send copies to the Secretaries of Defense, the Army, the Air Force, and the Navy; and the Director, Office of Management and Budget. We will make copies available to others upon request.

Please contact me at (202) 512-4841 if you or your staff have any questions concerning this report. Other major contributors are listed in appendix II.

Sincerely yours,

Louis J. Rodrigues
Director, Systems Development
and Production Issues

Executive Summary

Purpose

The military services are spending or plan to spend $3.8 billion on electronic warfare devices called radar warning receivers (RWRs) to protect current aircraft against radar-controlled weapons. The services are also developing RWRs for future-generation aircraft, such as the F-22. RWRs alert pilots that they have been detected by enemy radar so that evasive maneuvers or other protective measures can be taken.

For over a decade, congressional committees have encouraged the services to develop common electronic warfare systems that can be used by more than one service to meet the common threat. Achieving commonality avoids duplicative costs for system development, enables lower unit production costs through larger quantity buys, and simplifies logistical support.

At the request of the Chairman of the Legislation and National Security Subcommittee, House Committee on Government Operations, GAO assessed whether the services had made progress in achieving commonality of RWRs since 1987, when the Subcommittee held a hearing on the issue.[1] The Air Force and the Navy operate most of the fixed-wing fighter and attack aircraft in the U.S. force structure. RWR programs for these aircraft were the focus of the 1987 hearing and are the primary subject of this report. As part of its review, GAO also evaluated Air Force plans for acquiring an RWR for the B-1B bomber, which can use the same type of RWR as fighter and attack aircraft. To a lesser extent, GAO reviewed RWR programs for the services' helicopters and special purpose aircraft to determine whether commonality was being achieved.

Background

GAO testified at the 1987 hearing and subsequently reported that the Department of Defense (DOD) had not implemented prior congressional and GAO recommendations aimed at promoting commonality in RWR programs.[2] Instead, the Air Force and Navy were acquiring several different systems for existing fixed-wing tactical fighter and attack aircraft. None of the RWRs were common to both Air Force and Navy aircraft.

GAO recommended that the Secretary of Defense select the best radar warning receiver, based on cost and effectiveness, for maximum common

[1]DOD's Management of Radar Warning Receiver Programs, April 28, 1987, 100th Congress, 1st Session.

[2]Air Force and Navy Radar Warning Receiver Programs (GAO/T-NSIAD-87-31, Apr. 28, 1987) and Electronic Warfare: Navy/Air Force Still Developing Separate, Costly Radar Warning Receivers (GAO/NSIAD-87-167, July 1, 1987).

use on existing tactical aircraft and stop those programs that could not be demonstrated to be cost-effective. In October 1987, the House Committee on Government Operations reiterated this recommendation.[3] DOD agreed that commonality was an important element of system acquisition and generally agreed with the recommendations. DOD indicated that the military services would be required to seek joint solutions to similar requirements and strive for maximum commonality.

Results in Brief

Despite congressional emphasis on and DOD's stated commitment to commonality, the Air Force and Navy have continued to acquire and upgrade different RWRs to protect fixed-wing fighter and attack aircraft and have made no progress in achieving RWR commonality for these type of aircraft. The lack of progress continues in part because DOD relied on analysis that was inadequate to justify perpetuation of separate RWR programs. Prospects for achieving system commonality for future fixed-wing fighter and attack aircraft are also uncertain because DOD has no plans to ensure use of a common system.

GAO found that commonality is feasible and that substantial savings can be realized. Under the Army's leadership, a common RWR was acquired for helicopters and other special purpose aircraft of the Army, Marine Corps, and Air Force. In addition, a follow-on system for certain Army and Marine Corps special purpose aircraft and helicopters is being jointly acquired, with savings estimated to be about equal to the system acquisition cost.

Principal Findings

Services Continue to Acquire and Upgrade Separate RWRs

Since 1987, the Air Force and Navy have successfully resisted DOD's attempt to foster RWR commonality. As a result, the Air Force is acquiring different RWRs for each of its main fixed-wing fighter and attack aircraft and, in one case, is producing one RWR while upgrading another for the same aircraft. The Navy has also continued to acquire and upgrade RWRs for its aircraft. Overall, the Air Force and Navy have in use or are acquiring some 12 different RWRs for fixed-wing fighter and attack aircraft. None of these systems are being used on both Air Force and Navy aircraft.

[3]Air Force and Navy Are Still Proliferating Radar Warning Receivers That Duplicate Each Other, House Report 100-331, October 1, 1987.

DOD Has Been Ineffective in Controlling RWR Proliferation

Following the 1987 hearing and GAO's related report, DOD informed the services that proliferation of RWRs must be brought under control and restricted obligation of funds for certain RWR programs pending preparation of a joint-service plan to reduce the proliferation. However, at the insistence of the Air Force and Navy, this action was overturned. The Air Force and Navy subsequently performed a cost-effectiveness analysis concluding that continuation of the separate programs was the best approach.

GAO found that the analysis used to justify continuation of the separate RWR programs was flawed and inconsistent with GAO and the House Committee on Government Operations' recommended methodology. The analysis used faulty assumptions that understated the costs of continuing the separate systems; failed to identify the best RWR based on cost and effectiveness, as GAO and the Committee had recommended; and thus failed to consider the possible cost savings that could result from a common RWR.

Uncertain RWR Commonality for Future Aircraft

An opportunity exists for RWR commonality as future-generation aircraft are developed and before separate RWR programs gain momentum. Accordingly, DOD and congressional conferees have identified the Integrated Electronic Warfare System, which includes an RWR capability, as offering an opportunity for achieving commonality in future aircraft.

While GAO has not evaluated the Integrated Electronic Warfare System, and thus neither endorses nor opposes it, GAO noted that DOD has established no controls to ensure that commonality is achieved with this system. For instance, the Air Force is planning to use the system on its F-22 aircraft, but is developing a new electronic warfare suite, including an RWR capability, as part of its efforts to convert the B-1B aircraft to a tactical bomber. The Air Force's B-1B acquisition strategy does not require commonality and leaves the choice of RWR capability to the contractor. The Navy intends to use an advanced version of its ALR-67 RWR on its new F/A-18E/F aircraft. Also, the Navy had planned to leave the choice of an RWR to the contractor for its recently terminated A/F-X aircraft.

Commonality Is Feasible and Less Costly

To DOD's credit, the services have acquired a common RWR for helicopters and special purpose aircraft. As the lead service, the Army procured the APR-39(V)1 RWR for its own aircraft as well certain aircraft of the Marine

Corps and Air Force. Also, the Army is jointly procuring its latest RWR, the APR-39A(V)2, with the Navy and Marine Corps.

Because of a lack of complete cost records, the Army was unable to estimate the savings from having acquired the common APR-39(V)1. However, the Army estimated that savings to result from jointly acquiring the APR-39A(V)2 could exceed $187 million, about equal to the program's $190 million acquisition cost. Although relatively minor when compared to Air Force and Navy RWR programs, these acquisitions demonstrate that commonality and resulting substantial savings can be achieved.

Recommendations

GAO believes that the course recommended in 1987 remains a sound approach to achieving RWR commonality. Accordingly, GAO recommends that the Secretary of Defense select the best RWR, based on cost and effectiveness, for maximum common use on existing Air Force and Navy tactical aircraft, including the B-1B bomber. This analysis should weigh each RWR against all other RWRs to identify the system that provides the required level of aircraft protection at the least cost. Costs considered in the analysis should include all future costs applicable to each system's life cycle. In implementing this recommendation, DOD should consider that quickly achieving substantial commonality may not be practical because of budget considerations. However, commonality can be accomplished over a reasonable period of time as individual Air Force and Navy systems require replacement or major upgrades.

GAO also recommends that the Secretary establish controls over the services' new aircraft acquisitions to ensure that the maximum practical RWR commonality is achieved.

Matters for Congressional Consideration

Despite long-standing emphasis on achieving RWR commonality, none has been achieved for Air Force and Navy fighter and attack aircraft. To promote commonality, Congress may wish to

- restrict or deny funds to procure new systems or upgrade RWRs for existing aircraft until DOD has done an acceptable analysis consistent with GAO's recommendation to the Secretary of Defense and then fund only those programs that are consistent with the analysis and
- require DOD to report the controls it is establishing to ensure that maximum practical RWR commonality is achieved for future-generation aircraft.

Agency Comments

As requested, GAO did not obtain written agency comments on this report. However, GAO discussed the facts in the report with officials from the Office of the Under Secretary of Defense for Acquisition and from Air Force, Army, and Navy headquarters, and has incorporated their views as appropriate. They generally agreed with the facts contained in the report, but GAO did not obtain their comments on the recommendations.

Contents

Abbreviations

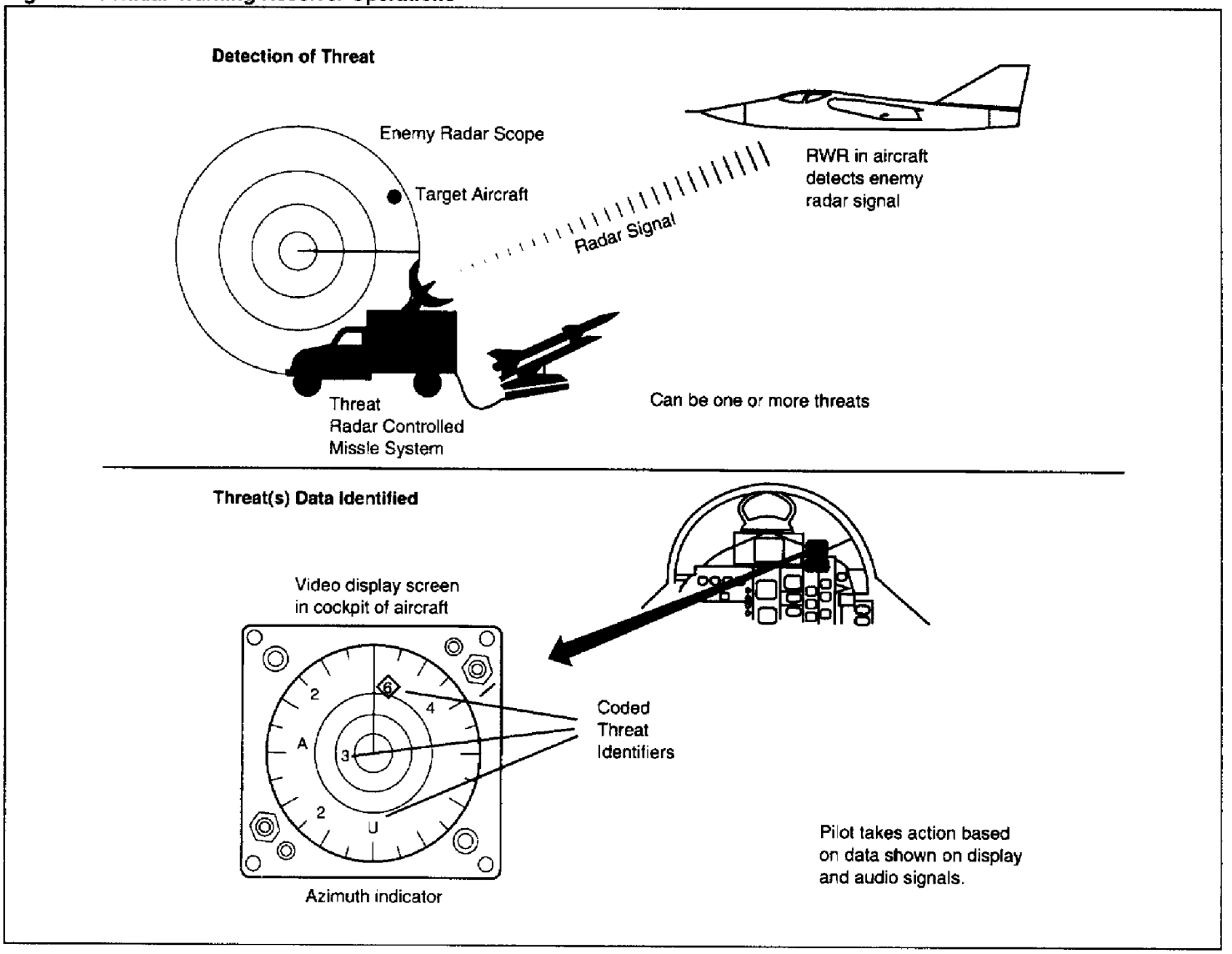
GAO	General Accounting Office
DOD	Department of Defense
INEWS	Integrated Electronic Warfare System
RWR	radar warning receiver

Introduction

The potential threat to military aircraft includes land-based weapons, such as surface-to-air missiles, as well as weapons launched from hostile aircraft. Many of these threat systems rely on radars to detect and track target aircraft and, in some cases, to guide the missile to the target or direct gunfire.

To protect against these threats, the military services equip aircraft with electronic warfare devices called radar warning receivers (RWR). As figure 1.1 shows, RWRs sense the signal from hostile radars, provide an audio warning signal to the pilot, and display the warning information on a video screen in the aircraft cockpit. The signal and display identify the threats, provide their location or relative bearings, and rank the threats in order of danger to the aircraft. Upon receiving the warning, pilots choose from various options to defeat the threat, such as maneuvering to make radar tracking more difficult or employing electronic jamming to interfere with the radar.

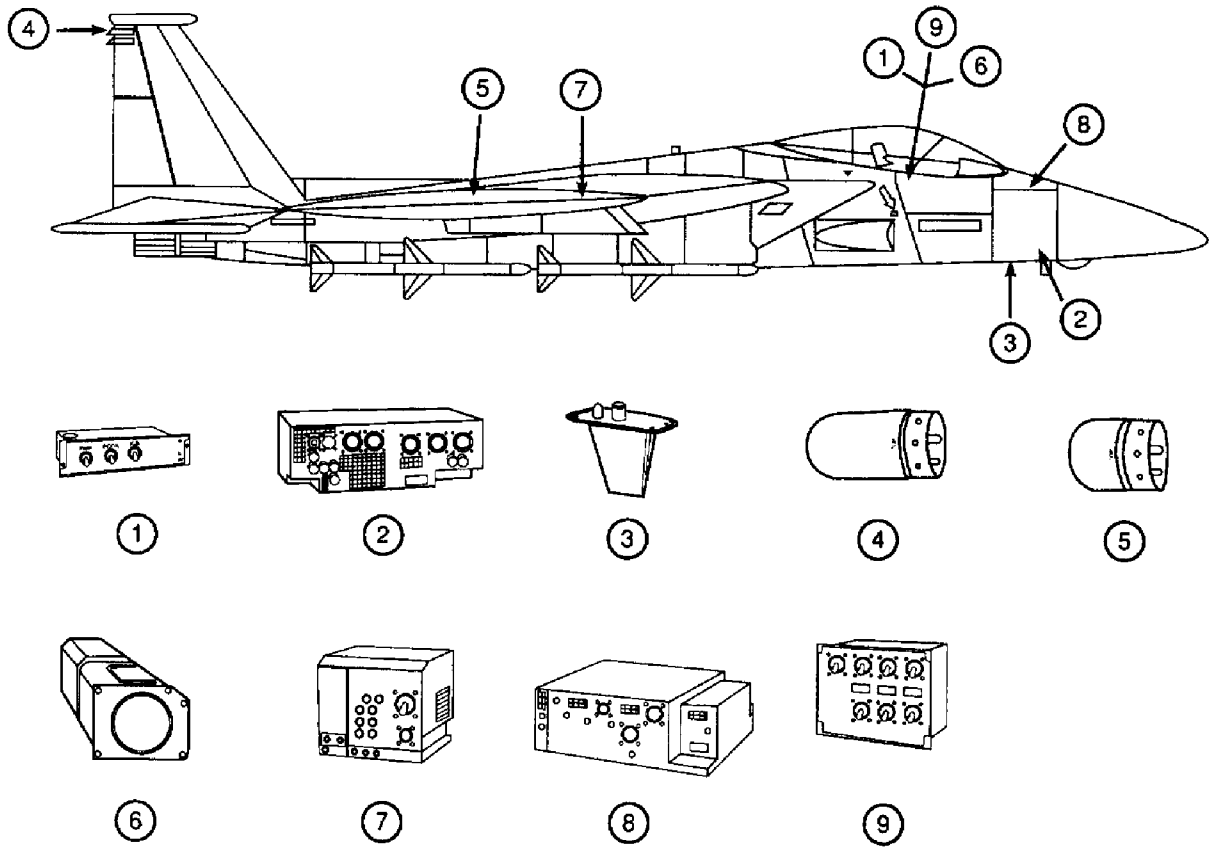
Figure 1.1: Radar Warning Receiver Operations



The military services consider RWRs to be critical to aircraft survivability. To acquire new or upgrade existing RWR systems for tactical, attack and special purpose aircraft and helicopters, the services are spending or plan to spend $3.8 billion on systems that will begin production by 1994. Additional funds will be spent to provide an RWR capability for future aircraft, such as the F-22. The Air Force and the Navy operate most of the

fixed-wing fighter and attack aircraft in the U.S. force structure. See appendix I for additional RWR cost information. An example of an RWR is shown in figure 1.2.

Figure 1.2: F-15 Radar Warning Receiver



Prior GAO Work

In 1987, we testified before the Legislation and National Security Subcommittee, House Committee on Government Operations, and subsequently reported that the Air Force and Navy were acquiring several different RWRs for existing tactical aircraft and that none were common to Air Force and Navy aircraft.[4] We also testified and reported that the Department of Defense (DOD) had not implemented earlier congressional and GAO recommendations promoting commonality and that the services had not capitalized on opportunities to achieve commonality.

GAO recommended that the Secretary of Defense select the best RWR, based on cost and effectiveness, for maximum common use on existing Air Force and Navy tactical aircraft and stop those RWR programs that could not be demonstrated to be cost-effective. The House Committee on Government Operations reiterated this recommendation in its report, Air Force and Navy Are Still Proliferating Radar Warning Receivers That Duplicate Each Other, House Report 100-331 (Oct. 1, 1987). DOD agreed that commonality was an important element of system acquisition and generally agreed with the recommendations. DOD indicated that the military services would be required to seek joint solutions to similar requirements and strive for maximum commonality.

Objectives, Scope, and Methodology

At the request of the Chairman of the Legislation and National Security Subcommittee, we assessed whether the services had made progress in achieving RWR commonality since the Subcommittee's 1987 hearing on the issue. We focused primarily on RWRs for Air Force and Navy fixed-wing tactical fighter and attack aircraft because the 1987 hearing pertained to those RWRs. Because bomber aircraft can use the same type of system as fixed-wing fighter and attack aircraft, we also examined the Air Force's plans for acquiring an RWR for the B-1B bomber.[5] In addition, at the request of the Chairman, we examined RWRs for helicopters to determine whether commonality was being achieved.

To accomplish our objectives, we compared RWR programs addressed in the 1987 hearing to current programs for fixed-wing tactical fighter and attack aircraft. We also examined DOD's efforts to capitalize on opportunities for commonality among those programs as well those for

[4]Air Force and Navy Radar Warning Receiver Programs (GAO/T-NSIAD-87-31, Apr. 28, 1987) and Electronic Warfare: Navy/Air Force Still Developing Separate, Costly Radar Warning Receivers (GAO/NSIAD-87-167, July 1, 1987).

[5]Of the other Air Force bombers, the B-52 uses the same RWR as several other fighter and attack aircraft, while the B-2's RWR function is integrated in the aircraft's defensive system and is not practical for use in fighter and attack aircraft.

helicopters and special purpose and bomber aircraft. We reviewed acquisition records and plans, documents reflecting justification for the programs, DOD policy directives and studies bearing on commonality, and other related records. We also discussed various aspects of our work with system program managers and other DOD officials.

We performed our work at the following locations:

- Office of the Under Secretary of Defense for Acquisition, Washington, D.C.;
- Joint Electronic Warfare Center, Kelly Air Force Base, Texas;
- Warner Robins Air Logistics Center, Robins Air Force Base, Georgia;
- Aeronautical Systems Center, Air Force Materiel Command, Wright Patterson Air Force Base, Ohio;
- Naval Air Systems Command, Washington, D.C.; and
- Project Manager's Office for Aviation Electronic Combat, U.S. Army, St. Louis, Missouri.

We conducted our review from September 1992 to August 1993 in accordance with generally accepted government auditing standards.

As requested, we did not obtain written agency comments on this report. However, we discussed the information in the report with officials from the Office of the Under Secretary of Defense for Acquisition and from Air Force, Army, and Navy headquarters, and have incorporated their views as appropriate. They generally agreed with the facts contained in the report, but we did not obtain their comments on the recommendations.

Air Force and Navy Have Made No Progress in Achieving RWR Commonality for Fixed-Wing Fighter and Attack Aircraft

Despite continued congressional emphasis on the need to increase commonality and DOD's stated commitment to commonality, the Air Force and Navy have continued to pursue different programs at a cost exceeding $3.4 billion and have made no progress in achieving RWR commonality for fixed-wing tactical fighter and attack aircraft. The lack of progress continues, in part, because DOD permitted continuation of separate RWR programs based on a joint Air Force and Navy analysis that was inadequate and inconsistent with recommendations made by us and the House Committee on Government Operations in 1987. Further, prospects for achieving commonality in future aircraft RWRs are uncertain because DOD has no plans to ensure use of a common system.

Yet, RWR commonality is feasible and can result in substantial savings. The services have already acquired a common RWR for helicopters and special purpose aircraft. In addition, they are jointly acquiring a follow-on system, with savings estimated to be about equal to the system's total acquisition cost.

Congress Continues to Emphasize Need for Common Electronic Warfare Systems

For over a decade, Congress has urged the development of common electronic warfare systems to reduce the costly proliferation of duplicative systems and achieve cost savings in program development, production, and logistics. The following examples demonstrate congressional efforts to reduce electronic warfare proliferation.

The House Conference Report on the National Defense Authorization Act for Fiscal Year 1985 stated:

"The conferees agreed that better coordination is required among all four services in identifying electronic warfare requirements and the programs required to address them. The conferees agreed that greater commonality could be achieved to reduce costs and improve capability . . . . Accordingly, the conferees request the Secretary of Defense to require the services to develop a comprehensive, coordinated electronic warfare plan that addresses . . . the prospects for commonality and joint systems . . . ."

A 1987 report of the House Committee on Government Operations concerning electronic warfare programs stated:

"This committee has long urged an end to wasteful proliferation in military service production programs. We have particularly emphasized the need to avoid duplication . . . improve the readiness of our forces, and reduce costs by developing common systems that would meet interservice needs . . . . [Furthermore,] increased use of common weapon

systems would significantly reduce costs and enhance readiness, interoperability, and reliability."

The House Conference Report on the National Defense Authorization Act for Fiscal Year 1989 stated:

"Further, the conferees direct, as a matter of DOD policy, that when common requirements exist and potential cost savings can be quantified, commonality be maximized to the extent possible in all electronic warfare acquisitions."

The conferees expressed a specific concern about the number of different RWRs and directed the services to limit spending on older RWRs. The conferees also expressed a belief that the Integrated Electronic Warfare System (INEWS) offered the best opportunity for maximizing commonality in electronic warfare systems for future aircraft.

DOD Recognizes Need for Commonality

As early as 1985, DOD recognized the need to achieve commonality in electronic warfare programs. In its 1985 electronic warfare plan, DOD stated:

"The need to achieve a beneficial level of commonality is obvious . . . . Joint development programs can reduce the costly proliferation of unique systems and minimize the fiscal impact of system updates . . . ."

DOD policy statements also reflect congressional concerns about the proliferation of electronic warfare systems. DOD policy states that prior to initiating a new acquisition program, the services must consider using or modifying an existing system or initiate a joint-service development program. DOD policy also requires the services to consider commonality alternatives at various points in the acquisition process.

Services Continue to Acquire and Upgrade Separate RWRs

Despite DOD's stated commitment to commonality, the Air Force and Navy have continued to acquire and modify separate RWR systems for fixed-wing tactical fighter and attack aircraft and have achieved no commonality for these type of aircraft since 1987. Table 2.1 shows the RWRs that were being acquired in 1987 and their current status.

Table 2.1: Current Status of RWRs Being Acquired in 1987

RWR	Aircraft	Current status
Air Force		
ALR-56C	F-15	In production
ALR-62(V)6	F-111	In production
ALR-69	F-16	Undergoing upgrade to 69I
ALR-69I	F-16, A-10, F-4	In production
ALR-56M	F-16	In production[a]
Navy		
ALR-45F	F-4, RF-4B, A-4, A-6, A-7E, AV-8C	Phased out
ALR-67	F/A-18, F-14, A-6E, AV-8B	Being upgraded as (V)2 Improved
ALR-67I	F/A-18, F-14, A-6E, AV-8B	Being developed as (V)3 to replace (V)2 Improved

[a]In 1987, the ALR-56M and the ALR-74 were being competed for use on the F-16. The ALR-56M won the competition, and the ALR-74 was terminated.

As indicated in the table, the RWRs that were being acquired in 1987 are, for the most part, still being acquired. However, the Navy is acquiring a new version of its ALR-67 not planned in 1987. In 1987, the Navy was producing its basic ALR-67 while developing its replacement, then identified as the ALR-67I, or Advanced Special Receiver. Since then, the Navy has completed production of the basic ALR-67, started an $86 million program to correct its performance deficiencies, and is still developing the Advanced Special Receiver, now called the ALR-67(V)3, to replace the improved version of the ALR-67.

The Air Force's ALR-69, used in the F-16 aircraft, also represents an example of the continuing proliferation of RWRs. During the 1980s, the Air Force determined that the ALR-69's performance was deficient and could not be upgraded. The Air Force first decided to develop the ALR-74 as a replacement and then decided to compete the ALR-74 against the ALR-56M. The Air Force selected the ALR-56M and in 1989 began its production. The Air Force then decided to upgrade the ALR-69 at an estimated cost of about $43 million because equipping all F-16s with the ALR-56M would be too expensive, according to a DOD official. Thus, the Air Force now has two separate RWRs for the same aircraft.

Overall, the Air Force and Navy have in use or are acquiring 12 different RWRs for these aircraft.[6] None of the 12 are common to both Air Force and Navy aircraft.

DOD Has Not Effectively Managed RWR Programs to Achieve Commonality

The lack of progress in achieving commonality continues because DOD allowed the services to continue their separate programs based on a cost-effectiveness analysis that was inadequate and inconsistent with GAO and congressional committee recommendations.

In 1987, we and the House Committee on Government Operations recommended that the Secretary of Defense select the best RWR, based on cost and effectiveness, for maximum common use on existing Air Force and Navy tactical aircraft. To ensure selection of the best RWR, we and the Committee further recommended that cost-effectiveness analyses performed should not be restricted to short-term cost, but should consider the life-cycle cost of the alternatives, including expected savings to result from commonality.

Following the 1987 recommendations, DOD's Under Secretary of Defense for Acquisition informed the services that proliferation of RWRs must be brought under control and restricted obligation of funds for certain RWR programs pending preparation of a joint-service plan to reduce the proliferation. However, the Air Force and Navy opposed this initiative, stating that achievement of near-term commonality would be too costly both in dollars and combat capability.

In response to the services' positions, the Deputy Secretary of Defense removed the funding restriction but requested that a joint Air Force/Navy analysis be conducted to determine the most cost-effective alternative. The joint analysis, completed in 1988, concluded that no single alternative provided the best answer for reaching the goal of interservice commonality and recommended that DOD allow the services to proceed with their planned acquisitions. DOD agreed and allowed the services to proceed with separate programs.

However, the joint analysis failed to determine the most cost-effective RWR. It ignored costs to update the RWRs over their life cycle, omitted several programs and related costs, was inconsistent in its treatment of operational performance, and charged INEWS with costs that would have

[6]In addition to the eight RWRs listed in table 2.1, the Air Force uses the ALR-46, ALR-56A, and ALR-62 RWRs, which have completed production. The Navy is producing the ALR-67(V)2 Improved as an interim RWR.

been incurred anyway and failed to give the system credit for additional capabilities. These flaws had the effect of understating the cost of continuing existing programs and penalizing alternatives aimed at achieving commonality.

The analysis assumed that the RWRs would not undergo major modifications over their life cycle, assumed to be 15 years. Based on past acquisition experience, this assumption was unrealistic. For example, a major modification of the Navy's ALR-67 began production in 1988, 5 years after the original system began production. This modification program is to correct deficiencies in the basic ALR-67 and is estimated to cost $86 million. By assuming no major modification of the RWRs, the analysis underestimated the life-cycle costs of current systems and ignored the commonality benefits of updating one rather than several systems.

The analysis also excluded several systems and related costs and therefore further understated the cost of continuing separate programs. For example, the analysis ignored the cost of completing the ALR-56C program. This system, used on the Air Force's F-15 aircraft, is still being acquired at a total acquisition cost of $572 million.

The joint analysis was inconsistent in its treatment of operational performance when assessing RWRs to achieve commonality. For example, the ALR-56M, used on the Air Force's F-16 aircraft, was rejected for Navy use in part because it would not meet joint operational needs through 2005. However, it was considered adequate for Air Force aircraft, although it was projected to satisfy operational requirements only through the mid-1990s. Additionally, the analysis penalized the Navy's ALR-67 Advanced Special Receiver for Air Force use because it was not projected to be available until fiscal year 1994, which would cause prolonged use of the Air Force's older, less capable ALR-69. Nevertheless, the Air Force has subsequently decided to retain the ALR-69 and upgrade it.

The INEWS was one of the alternatives considered in the joint analysis to achieve commonality but was rejected as too costly. However, the analysis erroneously charged INEWS with costs that would be spent anyway and should have been excluded. For example, the analysis charged INEWS with development costs as well as the cost of introducing it into the logistics system. However, the Air Force's Advanced Tactical Fighter System Project Office was already developing INEWS for the F-22 aircraft and would be introducing it into the logistics community. Additionally, the analysis did not credit INEWS for meeting requirements longer and having

capabilities not available with other RWRs. For example, the analysis projected the ALR-56M to meet operational requirements through the mid-1990s and INEWS to meet requirements through 2005, but did not calculate a cost benefit for increased performance.

Uncertain Prospects for Future Commonality

An opportunity exists for RWR commonality as future-generation aircraft are developed and before separate RWR programs are initiated and gain momentum. As recently as May 12, 1993, the Under Secretary of Defense for Acquisition testified that in the development of the next generation of tactical aircraft, commonality among the services is to be emphasized at the system and subsystem levels.[7] However, DOD does not have acquisition controls established to ensure commonality of RWRs in future aircraft.

DOD has stated that achieving commonality on existing aircraft is difficult because costly retrofitting is often required. DOD's position has been that the greatest potential for achieving commonality of electronic warfare programs is during the development of new aircraft, and DOD has recommended INEWS for use in future service aircraft. While we have not evaluated INEWS, and thus neither endorse nor oppose it, we noted that DOD has established no controls to ensure that commonality is achieved with this system. Also, the services' acquisition approaches for their new aircraft do not ensure use of a common RWR, and the services may develop their own RWR systems, again missing commonality opportunities.

The Air Force is the lead agency in developing INEWS, including an RWR capability, for use in its new F-22 fighter aircraft. However, the Navy's acquisition strategy for the recently terminated A/F-X aircraft did not require use of INEWS, but rather allowed the contractor to develop a completely different RWR capability. Also, the Navy plans to use an advanced version of the ALR-67—Improved or (V)3—in the planned F/A-18E/F aircraft.

Further, the Air Force has begun acquiring a new electronic warfare suite, including RWR capability, for its B-1B bomber aircraft. Again, DOD has established no controls to ensure RWR commonality, and the acquisition strategy allows a contractor to develop a separate RWR.

[7]Statement before the Defense Subcommittee of the Senate Appropriations Committee, May 12, 1993, by John M. Deutsch, Under Secretary of Defense for Acquisition.

Commonality Is Feasible and Less Costly

An RWR system can be used on more than one type of aircraft, thus avoiding unnecessary costs that result from funding a multitude of similar development and upgrade programs. Commonality among the services' systems can result in economy of scale savings because the larger quantity buys stemming from common use usually result in lower procurement costs. Similarly, lower support costs result from a more simplified logistics system providing common repair parts, maintenance, test equipment, and training.

To DOD's credit, the services have acquired a common RWR for selected helicopters and special purpose aircraft. According to an Army official, the Army procured 3,466 of the APR-39(V)1 for its aircraft as well as 750 for certain aircraft of the Marine Corps and Air Force. Because of a lack of complete cost records, the Army was unable to estimate the savings from having acquired the common APR-39(V)1.

In addition, the Marine Corps plans to join the Army in the acquisition of the follow-on APR-39A(V)2 system. The Marine Corps plans to acquire 707 APR-39A(V)2 systems for use in various helicopters and aircraft, such as the AH-1W and the KC-130, and the Army plans to acquire 143 systems for use in helicopters and special purpose aircraft, such as the RC-12 reconnaissance aircraft. A production decision is expected in mid-1994. Army officials estimated that assuming the services would otherwise separately develop and acquire RWR systems, the joint acquisition will result in savings of $187.7 million attributable to commonality benefits, as shown in table 2.2.

Table 2.2: Potential Commonality Savings Resulting From Joint Acquisition of APR-39A(V)2

Dollars in millions

Life-cycle phase	Savings
Development	$27.1
Production	89.4
Operation and support	71.2
Total	**$187.7**

The projected life-cycle savings are almost equivalent to the projected $190 million acquisition cost of the system. While these savings are significant, the APR-39A(V)2 program is small compared to the Air Force's $463 million ALR-56M program or the Navy's $896 million new ALR-67 program. Thus, potential commonality savings can be much greater.

As further evidence of the feasibility of commonality, the services are using the same RWR systems on different aircraft. For example, the ALR-69 system is used in the Air Force's F-16 and A-10 aircraft. Similarly, the ALR-67 system is used in the Navy's F-14, F/A-18, and A-6E aircraft, and the Marine Corps' F/A-18 and AV-8B aircraft.

Recommendations

Despite the opportunities presented with future aircraft, DOD does not have controls established to maximize the use of a common RWR. As a result, the services may continue to add to the RWR proliferation. The services have continued to demonstrate preference for service-unique systems over joint-service systems, thereby missing opportunities for savings possible through a common system. Despite DOD's stated commitment to achieving commonality, it has allowed the services to continue acquiring and upgrading RWR systems. Thus, a stronger role by DOD in managing RWR programs appears essential.

We believe that the course we recommended in 1987 remains a sound approach to achieving RWR commonality. Accordingly, we recommend that the Secretary of Defense select the best RWR, based on cost and effectiveness, for maximum common use on existing Air Force and Navy fixed-wing tactical fighter and attack aircraft, as well as the B-1B bomber. This analysis should weigh each RWR against all other RWRs to identify the system that provides the required level of aircraft protection at the least cost. Costs considered in the analysis should include all future costs applicable to each system's life cycle. In implementing this recommendation, DOD should consider that quickly achieving substantial commonality may not be practical because of budget considerations. However, commonality can be accomplished over a reasonable period of time as individual Air Force and Navy systems require replacement or major upgrades.

We also recommend that the Secretary establish controls over the services' new aircraft acquisitions to ensure that the maximum practical RWR commonality is achieved.

Matters for Congressional Consideration

Despite long-standing emphasis on achieving RWR commonality, none has been achieved for Air Force and Navy fighter and attack aircraft. To promote commonality, Congress may wish to

- restrict or deny funds to procure new systems or upgrade RWRs for existing aircraft until DOD has done an acceptable analysis consistent with our recommendation to the Secretary of Defense and then fund only those programs that are consistent with the analysis and
- require DOD to report the controls it is establishing to ensure that maximum practical RWR commonality is achieved for future-generation aircraft.

Cost of RWR Systems Being Improved and Acquired for Current Tactical Aircraft

Dollars in millions

System	Service	Spent	To be spent	Total system cost
ALR-67(V)2 Improved	Navy	$437	$132	$569
ALR-67(V)3	Navy	46	850	896
ALR-56C	Air Force	456	116	572
ALR-56M	Air Force	261	202	463
ALR-62(V)6	Air Force	246	0	246
ALR-69[a]	Air Force	570	43	613
APR-39A(V)1	Army	182	26	208
APR-39A(V)2	Army	27	163	190
Total		**$2,225**	**$1,532**	**$3,757**

Note: The table does not include radar warning receivers for future aircraft, such as the F-22, or for the existing B-1B bomber because the services had not estimated their cost. The F-117 aircraft does not have radar warning receivers.

[a]An additional $75 million improvement to the ALR-69 is planned but not funded.

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