UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

MISSION ANALYSIS AND
SYSTEMS ACQUISITION DIVISION

B-206548

MARCH 10, 1982

The Honorable Caspar W. Weinberger
The Secretary of Defense

Attention: Director, GAO Affairs

Dear Mr. Secretary:

Subject: Need to Examine ALR-74 Radar Warning Receiver Program Schedule (MASAD-82-23)

Our ongoing review of the need to upgrade or replace radar warning receivers in tactical aircraft has revealed a situation which, in our opinion, requires your early attention. Specifically, the Air Force Logistics Command is pursuing acquisition of the ALR-74 radar warning receiver at a pace scheduled to begin to introduce the receiver into operation on 1,388 F-16 and 707 A-10 aircraft at the earliest feasible date. However, the program offices for the F-16 and A-10 believe that because the schedule does not provide sufficient time for important installation studies, costly redesign and/or retrofit may be required if the installed receiver is found not to be compatible with other on-board avionics. Further, in the case of the F-16, the program office is concerned that in its final design the ALR-74 receiver may interfere with the orderly accomplishment of a larger overall improvement program involving many F-16 avionics items.

We recognize that improved radar warning receivers are a high priority for the Tactical Air Command and that this is undoubtedly influencing the ALR-74 development schedule. Nonetheless, past history has shown that failure to accomplish installation studies can result in a number of time consuming and costly problems.

BACKGROUND

A radar warning receiver is to intercept radar pulses so that the type of radar that transmitted it, the radar's range, and the pulses' direction of arrival are displayed (via a TV screen) to the pilot. With this information, a pilot knows he is being tracked by radar, if the radar is capable of weapons delivery, and when he will be in the lethal range of a radar directed weapon. This information also helps a pilot choose among the options of jamming, dispensing chaff, taking evasive action, or avoiding the threat. The Tactical Air Command considers a radar warning receiver to be a priority system in an aircraft's electronic warfare suite.

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The Air Force plans to buy 2,607 ALR-74s at a cost of $709 million. The receiver will be installed into 1,388 F-16s, 707 A-10s, and 512 F-4Es. An additional 945 F-16s and 269 B-52G/H models will get the ALR-74 if funding is approved. Funding for fiscal year 1983 is $130 million to procure ALR-74 hardware and support for 300 aircraft.

A key milestone in developing a system such as the ALR-74 is the critical design review (CDR). CDR is intended to freeze the design based on the specifications approved during the review by (1) determining that its detail design satisfies performance and engineering requirements, (2) establishing a design compatible with all the other equipment with which it will operate, and (3) assessing its producibility. After completing a successful CDR, contractual commitments are made and equipment is produced according to the specifications approved during CDR. Changes to a system's design after such contractual commitments are made result in increased costs and schedule slippages.

The ALR-74's predecessor, the ALR-69, currently in the F-16 and A-10, did not have the benefit of installation studies or flight tests. It was decided that installation studies and flight tests were not needed because the receiver was working well in the F-4. It was believed that if the ALR-69 worked well in the F-4, it would work well in other aircraft. Unfortunately, once the ALR-69 was operational in the F-16 and the A-10, deficiencies in the areas of azimuth accuracy, threat ambiguities, false alarms, and detection ranges, among others, surfaced. If installation studies had been done, many, if not all of the ALR-69 deficiencies could have been prevented, according to the F-16 and the A-10 program office officials. This is because installation studies would have determined the installed characteristics of the receiver.

Because of the ALR-69 deficiencies in the F-16 and A-10, the Commander, Aeronautical Systems Division, Air Force Systems Command, required in January 1981 that installation studies on all Government-furnished equipment, such as the ALR-74, be made. F-16 and A-10 program office officials told us that installation studies should be completed before the ALR-74's CDR so that characteristics, when installed, are understood and controlled before freezing its design.

INSTALLATION STUDIES WILL NOT BE COMPLETED BEFORE CRITICAL DESIGN REVIEW

In January 1982, the F-16 System Program Office (SPO) funded an installation study of the ALR-74 into the F-16. The study is not expected to be completed until June 1982, 2 months after the ALR-74 CDR is to be finished. The F-16 SPO has notified the ALR-74 program manager that the current program schedule is too optimistic. The F-16 SPO believes CDR should not be scheduled until the full

magnitude of integrating the ALR-74 into the F-16 is defined by a completed installation study.

The A-10 SPO has not been funded to do an installation study. SPO has also gone on record stating that such a study is required to learn how the ALR-74 will perform in the A-10.

We discussed this issue with officials from Headquarters, Air Force Logistics Command; the ALR-74 program office; and Headquarters, Air Force. We asked why the ALR-74 CDR is scheduled to be completed before the installation studies, in light of the ALR-69 history, direction from the Aeronautical Systems Division, and the F-16 and the A-10 program offices' notification that such studies are needed before CDR. We were told the ALR-74 will not repeat the mistakes of the ALR-69 because the ALR-74 will be flight tested before a production decision. We were also told the need for a more capable radar warning receiver than those operational today requires that the ALR-74 be fielded as soon as possible. We were advised that enough will be known about how to integrate the ALR-74 into aircraft by the time CDR is planned to maintain the current schedule.

Officials from the F-16 and the A-10 program offices disagree with this position. Scheduling CDR before installation studies are complete merely postpones surfacing potential deficiencies until flight tests or, if flight tests are shortcutted or not done, until a system becomes operational. In either case, a cost is realized in terms of needed corrective action and in terms of being incapable until corrective action is taken. Should a redesign be necessary, proceeding with CDR before installation studies are made could prevent the more capable ALR-74 from being fielded as soon as possible.

F-16 MULTINATIONAL STAGED IMPROVEMENT PROGRAM MAY COMPOUND THE PROBLEM

The F-16 Multinational Staged Improvement Program (MSIP) is a plan to provide the F-16 with new capability. The program involves the space, cooling, and power available for, and electromagnetic compatibility with, a number of avionic systems, including the ALR-74. Therefore, the F-16 SPO believes it is even more essential that the installation studies be made before freezing the ALR-74 design. MSIP is to satisfy the following tactical requirements:

--Beyond visual range air-to-air intercept.

--Night attack and under the weather capability.

--Enhanced precision navigation and strike.

--Enhanced tactical coordination and control.

The F-16 avionics bay is undergoing extensive modifications to accommodate the hardware which is to provide the capabilities listed above. This is a difficult task which is complicated because the ALR-74 must be integrated with future hardware programed for the same aircraft. To guard against the possibility that the F-16 cannot accept all the new hardware required, the F-16 SPO is recommending that the ALR-74 be restricted in terms of space, power, and cooling. To do otherwise could force an expensive redesign for up to 2,300 F-16s. F-16 SPO officials do not yet know how the ALR-74 should be designed to be compatible with MSIP. This effort is underway and is expected to be completed during June 1982.

The Air Staff official we discussed this issue with said the challenge is not to redesign the ALR-74, but to design new avionics around the existing constraints of the ALR-74. The new avionics include the Advanced Self-Protection Jammer, the Global Positioning System, the Joint Tactical Information Distribution System, Seek Talk (secure voice communications), and LANTIRN (low altitude navigation and targeting infrared system for night). We did not talk to the program managers of these systems to determine if their systems could be built around the existing constraints of the ALR-74.

We were told by the Air Staff official that to redesign the ALR-74 now, or particularly in the future, would cause (1) costly retrofits, (2) schedule delays which are unacceptable given the current need for the ALR-74, and (3) lack of commonality with existing radar warning receivers which is counter to congressional and Department of Defense direction. The Air Staff official we talked with believes the needs of the Air Force can best be met by maintaining the current ALR-74 program schedule and configuration.

F-16 program office officials believe that the arguments presented above become irrelevant should it come to pass that the ALR-74 will not properly function (inadequate space, cooling, power, and electromagnetically incompatible) in F-16 aircraft. Should this happen, a redesign is required which could cause greater delay than the 2 or 3 months required to complete the F-16 installation study before CDR is completed.

CONCLUSIONS AND RECOMMENDATIONS

We conclude that the present course of the Air Force Logistics Command to freeze the ALR-74 design and proceed with its development before important installation studies are completed could likely run the risk of schedule slippages and cost overruns. A revised schedule to complete installation studies before freezing the design should have a minimal impact of only 2 or 3 months.

We therefore recommend that you direct the Air Force to examine the ALR-74 acquisition schedule to assure you that risks

of cost and schedule overruns will be minimal if the current acquisition schedule is maintained. If this assurance cannot be provided, then a revised acquisition schedule should be established that will permit timely incorporation of installation studies.

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As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We would appreciate receiving a copy of your statement when it is provided to the congressional committees.

Copies of this interim report are being sent to the Director, Office of Management and Budget, and to the Secretary of the Air Force. We are also sending copies to the chairmen of the Senate and House Committees on Armed Services and Appropriations, the House Committee on Government Operations, and the Senate Committee on Governmental Affairs.

Sincerely yours,

W. H. Sheley, Jr.
Director