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Report to Congressional Committees

September 1994

BATTLEFIELD AUTOMATION

Requirements Need to Be Updated Before the Air Defense System Is Produced

GAO/NSIAD-94-213

GAO

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General Accounting Office
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National Security and
International Affairs Division

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September 22, 1994

The Honorable Sam Nunn
Chairman, Committee on Armed Services
United States Senate

The Honorable Daniel K. Inouye
Chairman, Subcommittee on Defense
Committee on Appropriations
United States Senate

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

The Honorable John P. Murtha
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

Because of continuing congressional interest about the cost, schedule, and performance problems of the forward area air defense (FAAD) system, we conducted a follow-up review focused on the Army's efforts to acquire a $1.1-billion command, control, and intelligence (C2I) system as part of its FAAD system. The FAAD C2I system consists of the ground-based sensor (GBS) to detect and track aircraft and the computer hardware and software to process that intelligence information.

In our previous report,[1] we recommended that the Secretary of Defense direct the Army to defer the GBS' low-rate initial production until testing proved that it met performance requirements and a cost and operational effectiveness analysis (COEA) justified the GBS as the best alternative for meeting forward area air defense needs. The Department of Defense (DOD) concurred and directed the Army to take corrective actions. In addition, at the time of that review, the Army was reevaluating its forward area air defense needs in light of major changes in both the threat and the FAAD weapons it planned to procure. Responding to DOD concerns about program requirements, the Army said a Division Air Defense Study would address and revise those requirements, which are needed to form the basis for testing systems and supporting the COEA.

[1]Battlefield Automation: More Testing and Analysis Needed Before Production of Air Defense Radar (GAO/NSIAD-93-175, July 30, 1993).

Results in Brief

Despite DOD's direction, the Army has not redefined the FAAD C2I system requirements and may also award a $59-million low-rate initial production contract before it receives the results of operational testing. As a result, the Army could be committing to the procurement of an unproven system that may not be justified.

Background

To protect soldiers and equipment at the front battle lines, the Army needs air defense capabilities to detect and react to attacks by hostile aircraft. The Army plans to provide this capability through the development, acquisition, and deployment of the FAAD C2I system. FAAD C2I, conceived in 1986 to counter the Warsaw Pact air threat includes the FAAD C2I system and several air defense weapon systems. The Army has spent $516 million developing and producing the FAAD C2I system and plans to spend another $586 million to complete development and production.[2]

Army Needs to Update Requirements

The massive Warsaw Pact air threat the FAAD C2I system was designed to counter has changed to smaller, less capable regional threats. In addition, the weapon systems intended to work with the FAAD C2I system have changed or been eliminated. Nevertheless, the Army has not updated the system's requirements. While it did update requirements for the forward area weapon systems, the Army plans to rely on a COEA to update requirements for the C2I systems. However, the purpose of a COEA is to evaluate alternatives to meet recognized defense needs, not to establish system requirements.

Threat and Weapon Systems Have Changed Dramatically

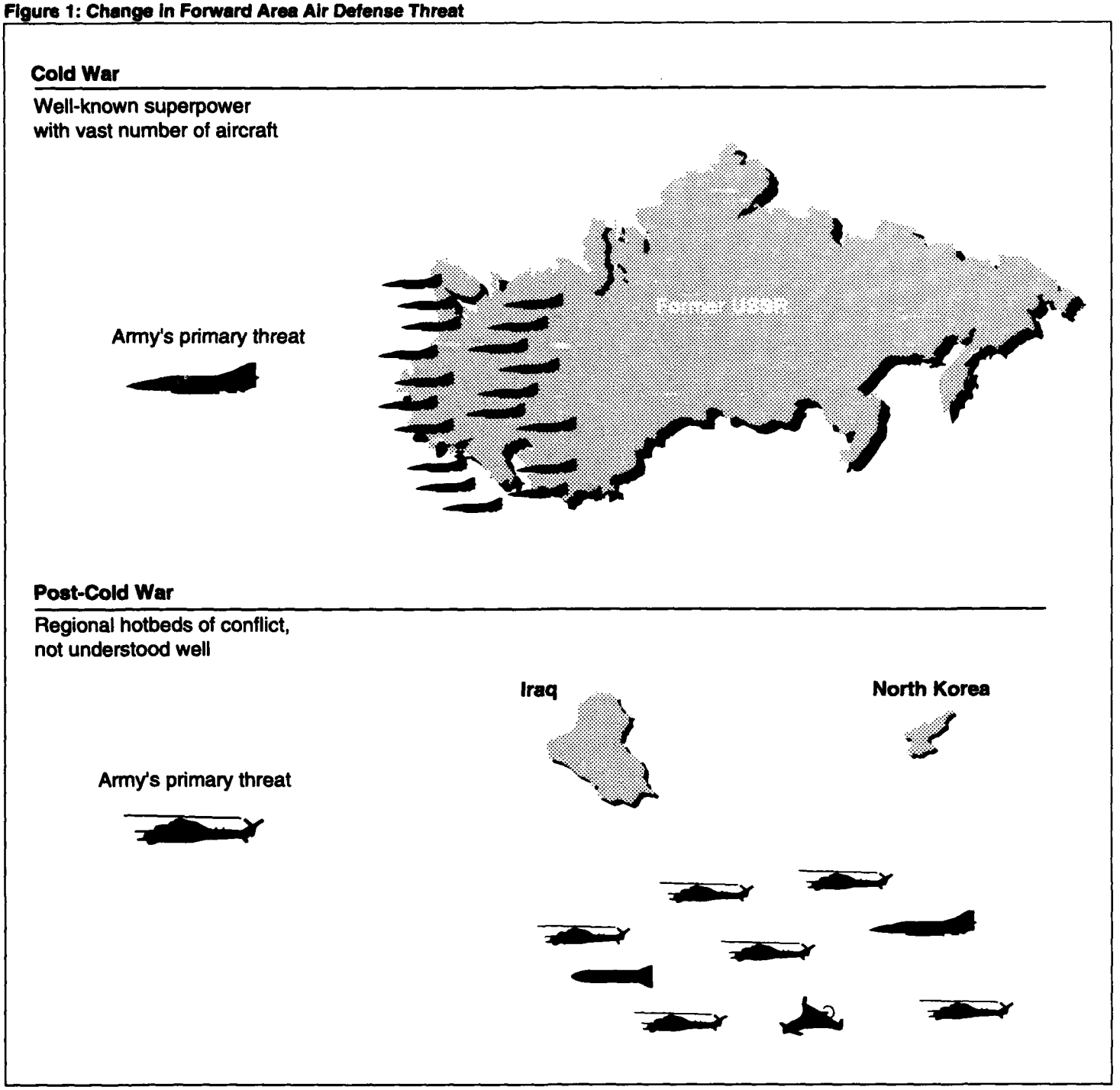
FAAD C2I system requirements most likely will change due to dramatic differences in the threat it was intended to counter and the weapons it was intended to work with. With the dissolution of the Soviet Union and breakup of the Warsaw Pact, the Defense Intelligence Agency and the Army now believe the primary threat comes from various regional hotbeds of conflict, such as Iraq or North Korea, which do not have the air power of the former Soviet Union.

Also, the FAAD C2I system was originally designed to counter the numerous fixed-wing aircraft of the Warsaw Pact that constituted the Cold War threat. The Army's latest post-Cold War air defense strategy for the forward area envisions Air Force fighter aircraft countering the

[2]The acquisition of the FAAD C2I system is broken into four blocks. The $516 million and $586 million are the development and production costs for Blocks I and II. The Army does not have a firm estimate for either Block III, the objective system, or Block IV, a preplanned improvement effort.

fast-moving fixed-wing threat, while the Army defends against slow-moving helicopters and unmanned aerial vehicles. The diminished numbers and different types of aircraft the FAAD C2I system is expected to counter raise questions about FAAD C2I system requirements, such as the number of aircraft a sensor must be able to track at one time or the range required to detect the aircraft. Figure 1 shows the change in the threat.

Figure 1: Change in Forward Area Air Defense Threat

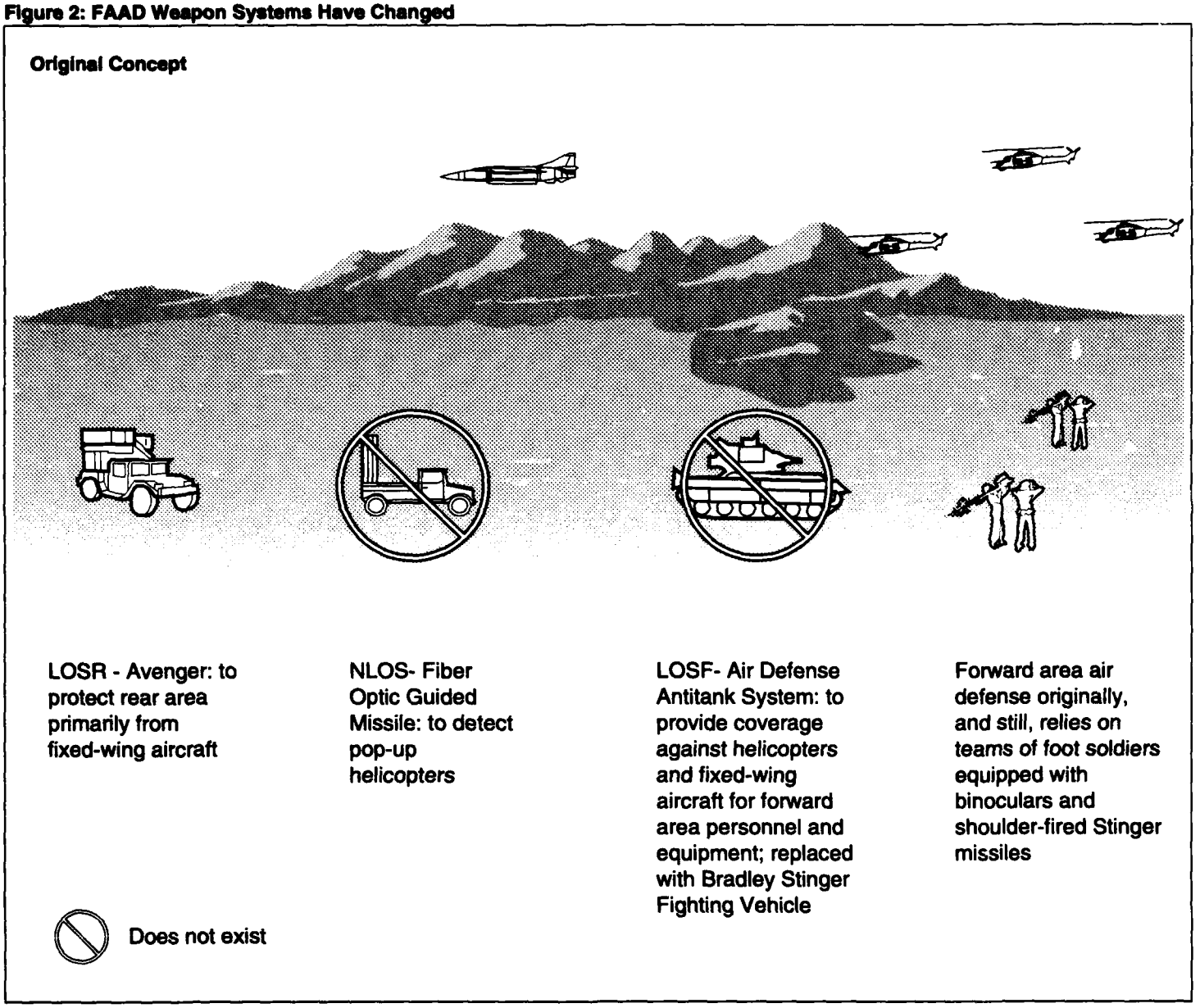


The weapon systems intended to work with the FAAD C2I system also have changed. To date, the Army has fielded only one of the three original planned weapons, the line-of-sight-rear (LOSR), the Avenger. This weapon was designed to use GBS data to protect rear assets primarily from attacks by fixed-wing aircraft. However, funds for the Avenger were cut in the fiscal year 1995 budget planning efforts, and the Army does not plan to buy additional Avengers after fiscal year 1995. Thus, the Army will possess only limited quantities of this weapon system.

The other two original weapons, the non-line-of-sight (NLOS) and line-of-sight-forward (LOSF), were canceled because of cost concerns and development problems. The Army has not developed a replacement for NLOS,[3] the fiber-optic guided missile, which was intended to counter pop-up helicopters. And instead of LOSF, the Air Defense Antitank System, the Army has fielded the Bradley Stinger Fighting Vehicle carrying teams of soldiers with shoulder-fired Stinger missiles. These are in addition to teams of foot soldiers equipped with binoculars and shoulder-fired Stinger missiles that have always been part of FAAD. Figure 2 shows how the original weapon systems concept has changed.

[3]The Army is developing an Enhanced Fiber Optic Guided Missile system as a part of its Rapid Force Projection Initiative. This system addresses a requirement similar to NLOS. It plans to demonstrate the missile system in an Advanced Concept Technology Demonstration scheduled for 1997, and production may or may not be an outcome of that demonstration, according to the Rapid Force Projection Initiative Program Manager. The Army does not currently have plans to buy more of the systems than those acquired for the demonstration.

Figure 2: FAAD Weapon Systems Have Changed



These drastic changes raise serious concerns about whether the FAAD C2I system requirements should remain unchanged. Therefore, it may be premature to commit to the planned development of sophisticated software.

Army Has Not Updated the FAAD C2I System Requirements

The Army has not responded to changes in the threat or weapon systems by updating the FAAD C2I system requirements. During our prior review of the GBS, Army air defense school officials told us they planned to reexamine the entire FAAD C2I system concept and recommend solutions in a Division Air Defense Study. However, the study, conducted in 1993, focused on FAAD weapon system capabilities and did not update the FAAD C2I system requirements.

According to the Division Air Defense Study Director, the Army did not assess the FAAD C2I system requirements in the study because of time and resource constraints. The study director and the FAAD C2I system project manager stated they were relying on an upcoming FAAD C2I system COEA to assess requirements. However, according to DOD Instruction 5000.2, the purpose of a COEA is not to establish or reassess requirements, but to identify the advantages and disadvantages of alternatives being considered to meet recognized defense needs.

A requirements study, on the other hand, would allow the Army to reassess the FAAD C2I system requirements in view of threat and weapon system changes. DOD Instruction 5000.2 mandates updates to system requirements at key decision points during development and acquisition. One major reason for documenting requirements is to avoid premature commitment to a system-specific solution.

Army Was Not Following DOD Procurement Guidance

In the past, the Army has not always followed DOD guidance for procuring systems, and there is some doubt it will adhere to that guidance with the FAAD C2I system. In 1993, we reported that the Army was developing and planned to procure the GBS without a COEA to determine its suitability and without completing operational testing. In response to that report, DOD said it expected the Army to complete a COEA by December 1994. DOD also delayed funding initial production of the GBS for 1 year to allow time to complete initial operational testing of the integrated system.

At the time we began this review, the Army still planned to award a low-rate production contract before either the COEA or testing were completed. In April 1994, during this review, the GBS product office decided to delay awarding a $59-million low-rate production contract from November 1994 to January 1995, just a few months prior to the full-scale production decision planned for April 1995. The award would be based on a December 1994 low-rate initial production decision to comply with DOD direction. A COEA and operational testing are expected to be completed in

December 1994. However, it is still uncertain that the COEA and operational testing will remain on schedule. The COEA study plan, for example, was supposed to be approved by the Army's Study Advisory Group by January 1994, but as of June 1994, the Army had received only limited approval of the plan. Similarly, in the past the schedule for operational testing has slipped.

The Army does not have a COEA to support acquisition of the GBS, although one is required at acquisition milestones. The Army began a COEA for the GBS in April 1990, but suspended it in March 1992 because of changes in the threat and weapon systems. A Directorate of Combat Developments, Army Air Defense Artillery School, representative stated that a COEA for the GBS was not feasible until future air defense needs are defined. The Army expected air defense needs would be updated in the Division Air Defense Study. However, as stated above, that did not happen.

Army Continues to Acquire System Despite Changes

Regardless of the diminished threat and changes to the weapon systems, the Army is fielding Block I, an interim configuration of the FAAD C2I system, to light and special divisions. The full-scale production decision is planned for April 1995 for the GBS and Block II of the FAAD C2I system.

Block I includes the computer hardware and basic software to interface with an interim sensor to detect aircraft and transmit air track data via an interim radio system. In September 1993, the 101st Airborne Division (Air Assault), Fort Campbell, Kentucky, accepted the first Block I system. The Army plans to field additional Block I systems to the 10th Mountain and 2nd Infantry Divisions in fiscal year 1995 and to the 82nd Airborne Division in fiscal year 1996, according to program officials.

Block II, another interim system, is to build on the basic capabilities in Block I, with the primary enhancements being improved software and the GBS instead of the interim sensor. The Army considers Block III to be the objective FAAD C2I system with sophisticated software and aircraft identification capabilities. Block IV is a preplanned product improvement to further enhance communications and air battle management. The Army has not established firm cost estimates or timetables for Blocks III and IV.

Recommendation

Given the uncertainties that continue to surround the FAAD C2I system acquisition, there is the potential for the Army to commit to an unproven system that may not be justified. Therefore, we recommend that the

Secretary of Defense direct the Secretary of the Army to defer any production and initial operational testing until the Army (1) updates the requirements for both the GBS and FAAD C2I system and (2) selects the best solution, based on a COEA, for satisfying the updated requirements. In addition, the Secretary of Defense should direct the Secretary of the Army to cancel the planned low-rate production decision because the full-scale production decision is only a few months later and the Army's reason (training) for initiating low-rate production is inconsistent with the purposes specified in 10 U.S.C. 2400 for initiating low-rate initial production. This would allow more time to evaluate test results before committing to production.

Agency Comments and Our Evaluation

While DOD agreed with much of the information in our report, it did not agree with our recommendations. DOD considers that the Army has validated the requirements for the FAAD C2I system against the current threat and changes in the air defense weapon systems. It, therefore, nonconcurred with our recommendation that the Army be required to defer low-rate initial production and initial operational testing until it has (1) updated the requirements for both the GBS and FAAD C2I system and (2) selected the best solution, based on a COEA, for satisfying those updated requirements. DOD also noted that the GBS is currently scheduled to undergo initial operational testing in conjunction with the FAAD C2I system prior to the full-scale production decision for both systems. On this basis, DOD nonconcurred with our recommendation that the Army be required to complete initial operational testing of the selected system prior to low-rate production.

DOD stated that the Army revalidated the original FAAD C2I system Block I and Block II (with the GBS) requirements with a "War Fighting Lens Analysis," which is an internal Army array of weapon systems needs and available funding. In response to DOD's comments, we examined the Army's "War Fighting Lens Analysis" and discussed it with Army and DOD officials. We found that while the "War Fighting Lens Analysis" did revalidate the need for FAAD, it did not revalidate or update the specific FAAD C2I system requirements. DOD also stated that the Division Air Defense Study validated the need for a FAAD command and control system to support FAAD requirements in the new post-Cold War environment. It noted, however, that the specific requirements for the system must be further defined. Therefore, while demonstrating a continued need for FAAD, the study did not address the specific requirements for the FAAD C2I system given the post-Cold War environment. DOD also stated that it believes that

the COEA for the FAAD C2I system will provide an analytical basis for updated requirements, at least for Block II for the heavy division. This position clearly demonstrates that the FAAD C2I system requirements may have changed from the original requirements because of changes in the threat and weapon systems. It also implies there is no current analytical basis or at least an adequate analytical basis for the current FAAD C2I system requirements.

We believe this indicates that the Army and DOD have decided to maintain the status quo rather than reanalyze and update the definitive requirements that a post-Cold War air defense system should satisfy. Further, it seems inconceivable that the original requirements, set in 1986 for a Cold War threat, have not changed in some way because of (1) the current very different and diminished threat and (2) the more limited set of weapon systems the FAAD C2I system and GBS will work with. But even when this issue is realistically addressed, another issue remains and that is whether DOD and the Army can afford the system given (1) reduced funding for DOD and the services, (2) serious underfunding of DOD's own future years defense program, and (3) a less costly sensor, the Light and Special Division Interim Sensor, already in the field. Also, relying on a COEA that does not use analytically based, definitive requirements could result in the Army prematurely committing to a system-specific solution, which is contrary to DOD acquisition guidance.

Given these facts, we continue to believe that the Army has not adequately updated the requirements for the FAAD C2I system and the GBS to reflect changes in the threat and weapon systems to be fielded. We, therefore, believe that our recommendation on the deferral of initial operational testing and production until updated requirements are completed should still be implemented.

DOD stated that it wanted to initiate low-rate production to procure limited numbers of the GBS to support training needs. However, providing for training needs is not one of the three purposes specified in 10 U.S.C. 2400 for initiating low-rate initial production. These purposes are (1) to provide production configured or representative articles for operational test and evaluation, (2) establish an initial production base for the system, and (3) permit an orderly increase in the production rate for the system sufficient to lead to full-rate production upon the successful completion of operational test and evaluation. However, the GBS low-rate initial production decision would not appear to be required for any of these reasons because the Army already has representative items for test,

and the system is composed of nondevelopmental items already in production. Therefore, low-rate production for testing articles, an initial production base, or ramping up would not appear to be needed.

DOD also noted that the full-scale production decision for the systems is now scheduled for April 1995, just 4 months after the December 1994 low-rate production decision. Given this change in schedule and the rationale for low-rate production, we have changed our recommendation to include eliminating the low-rate production decision from the Army's acquisition plan.

DOD's comments and our responses are in appendix I.

Scope and Methodology

To determine whether the Army has updated the FAAD C2I system requirements for the post-Cold War era, we reviewed DOD and Army documents, including the Air Capabilities Study and the Division Air Defense Study, which redefined the air threat to the forward area and the concept for air defense in the post-Cold War era. Also, we were briefed by the Defense Intelligence Agency on the post-Cold War threat to the forward area of the battlefield. In addition, we examined Army plans for an upcoming FAAD C2I COEA and reviewed DOD and Army acquisition policy and guidance for system requirements and COEAs.

Because the FAAD C2I system is dependent upon integration with the FAAD weapon systems, we also monitored the progress and problems of programs, such as the Avenger and the Bradley Stinger Fighting Vehicle weapon systems.

We obtained information and held discussions with officials in the following organizations in Huntsville, Alabama:

- Air Defense Command and Control Systems Project Office;
- FAADS Sensors Product Office;
- FAADS Project Office;
- Intelligence and Security Directorate, U.S. Army Missile Command; and
- Research, Development, and Engineering Center, U.S. Army Missile Command.

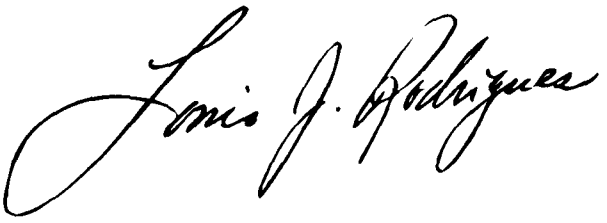
We also obtained information and held discussions with officials at the

- Defense Intelligence Agency, Washington, D.C.;
- U.S. Army Air Defense Artillery School, Fort Bliss, Texas;
- Headquarters, Department of Defense, Arlington, Virginia;
- Headquarters, Department of the Army, Arlington, Virginia;
- 101st Airborne (Air Assault) Division, Fort Campbell, Kentucky; and
- U.S. Army Training and Doctrine Command, Fort Monroe, Virginia.

We performed our review from July 1993 through August 1994 in accordance with generally accepted government auditing standards.

We are sending copies of this report to the Director, Office of Management and Budget; the Secretaries of Defense and the Army; and other interested parties. 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. Major contributors to this report are listed in appendix II.



Louis J. Rodrigues
Director, Systems Development
and Production Issues

Comments From the Department of Defense

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

ASSISTANT SECRETARY OF DEFENSE

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WASHINGTON, DC 20301-6000

August 18, 1994

Mr. Frank C. Conahan
Assistant Comptroller General
National Security and International
Affairs Division
U.S. General Accounting Office
Washington D.C. 20548

Dear Mr. Conahan,

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "BATTLEFIELD AUTOMATION: Updated Requirements Needed Before Production of Air Defense System," dated July 1, 1994 (GAO Code 707016), OSD Case 9729. The DoD partially concurs with the report findings, but nonconcurs with the recommendations.

See comment 1.

See comment 2.

See comment 3.

See comment 4.

See comment 6.
See comment 9.

While the Department agrees with much of the information contained in the draft report, there are several points that require additional discussion. The GAO primary concerns are that the Forward Area Air Defense Command and Control System and the associated Ground Based Sensor System are proceeding with major acquisition decisions without validated requirements and that a low-rate initial production decision for the Ground Based Sensor will be made without sufficient operational testing. It is the Department's position that the Army has validated requirements, which are identified in the Required Operational Capabilities document, against the current threat and reduced air defense weapons systems situation as identified in the GAO report for both these systems. Additionally, the formal Initial Operational Test and Evaluation for the two systems is scheduled for November 1994. The Army plans to use emerging results from this test to support the low-rate initial production decision for the Ground Based Sensor. The Department considers this as an acceptable acquisition strategy as this is much more stringent operational testing than is normally required for a low-rate initial production decision.

See comment 8.

The Department conducted a program review of these systems in January 1993 with an associated guidance memorandum provided to the Army. These systems also undergo scheduled Departmental reviews through the Defense

See comment 1.
See comment 7.

See comment 11.

See comment 12.

Acquisition Executive Summary process. The Army Tactical Command and Control System, to include the Forward Area Air Defense Command and Control System, will be reviewed by the C3I Systems Committee in October 1994. Additionally, the DoD has adequately responded to similar issues and recommendations in GAO Report, GAO/NSIAD-93-175, "BATTLEFIELD AUTOMATION: More Testing and Analysis Needed Before Production of Air Defense Radar," dated July 30, 1993 (GAO Code 395191).

It is the DoD position that the Army has met all program guidance necessary and that the current acquisition strategy for these systems is low risk. To date both systems are on schedule, within budgetary limitations and have met performance requirements for their current stage in the acquisition cycle. The Department is confident that successful fielding will be accomplished as planned and that the systems will meet user requirements. The Department will ensure that the programs continue to comply with appropriate acquisition policies and guidelines.

The detailed DoD comments on the draft report findings and recommendations are provided in the enclosure. The DoD appreciates the opportunity to comment on the draft report.

Sincerely,

Emmett Paige, Jr.

Enclosure

Now on p. 2.

See comment 1.

**GAO DRAFT REPORT - DATED JULY 1, 1994
(GAO CODE 707016) OSD CASE 9729**

"BATTLEFIELD AUTOMATION: UPDATED REQUIREMENTS NEEDED BEFORE PRODUCTION OF AIR DEFENSE SYSTEM"

DEPARTMENT OF DEFENSE COMMENTS

* * * * *

FINDINGS

- **FINDING A: Army Needs Air Defense Capabilities.** The GAO reported that to protect soldiers and equipment at the front battle lines, the Army needs air defense capabilities to detect and react to attacks by hostile aircraft. The GAO observed that the Army plans to provide this capability through the development, acquisition, and deployment of the forward area air defense system. The GAO pointed out that the forward area air defense system, conceived in 1986 to counter the air threat posed by the Warsaw Pact prior to its dissolution, includes the forward area air defense command, control, and intelligence and air defense weapon systems. The GAO noted that the Army spent $516 million developing and producing the forward area air defense command, control, and intelligence system and plans to spend another $586 million to complete development and production. (pp. 2-3/GAO Draft Report)

  DoD Response: Concur. However, it should also be noted that the Forward Area Air Defense Command and Control System also meets requirements of the current threat for today's environment. It is the DoD position that the system also provides situational awareness of the third dimensional friendly activities, to reduce the potential for fratricide and to increase the effectiveness of combined arms activities. In addition, the system is also the Air Defense system at Division and below that will provide the horizontal integration with other Battlefield Functional Area's operating systems of the Army Battlefield Command System.

- **FINDING B: Army Needs to Update Requirements.** The GAO concluded that although the massive air threat that the forward area air defense command, control, and intelligence system was designed to counter has changed to a smaller, less capable threat, and there have been changes in the

**Enclosure
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Now on p. 2.

weapons systems intended to work with the System, the Army has not responded by updating requirements. The GAO found that, while the Army updated requirements for the forward area weapon systems, it plans to rely on a cost and operational effectiveness analysis to update requirements for the command, control, and intelligence system. The GAO asserted, however, that the purpose of a cost and operational effectiveness analysis is to evaluate alternatives to meet recognized defense needs, not to establish system requirements. (p. 3/GAO Draft Report)

See comment 1.

DoD Response: Partially concur. The DoD disagrees that the Army has not updated requirements based upon the threat and changes in weapons systems for the Forward Air Defense Command and Control System. The Army revalidated the original requirements for the Block I and Block II (with the Ground Based Sensor) with a Warfighting Lens Analysis conducted in November 1993. The Army has also validated the need for the Forward Area Air Defense System Command and Control System with completion of the Division Air Defense Study. The Army is in the process of upgrading the Required Operational Capabilities Document into a Operational Requirements Document, as outlined in DoD 5000.2, that will (1) formally definitize requirements, (2) respond to the post cold war doctrine, and (3) redefine the Block III of the Forward Air Defense Command and Control requirements. This Operational Requirements Document is in staffing within the Army and will undergo DoD processing, to include the Joint Requirements Oversight Council, to support an April 1995 Milestone III decision for the program.

See comment 2.

The DoD agrees that a cost and operational effectiveness analysis is not to establish system requirements. However, it is the DoD position that a good cost and operational effectiveness analysis can be used to show the value that good target detection/communications provides to the Forward Area Air Defense System. In a January 11, 1993, Memorandum, the Department directed the Army to conduct a cost and operational effectiveness analysis to support the Milestone III decision for the Block II system to be fielded to the heavy divisions. The guidance provided by the Department includes alternatives that will permit verification of the need for the Forward Air Defense Command and Control System in heavy divisions. It is the DoD position that this cost and operational effectiveness analysis will provide an analytical basis for updated requirements, at least for Block II for the heavy division. Requirements for the Block III will be provided in the updated Operational Requirements Documents addressed in the above paragraph.

- **FINDING C: Threat and Weapon Systems Have Changed Dramatically.** The GAO reported that the forward area air defense command, control, and intelligence system requirements most likely will change due to dramatic differences in the threat it was intended to counter and the weapons it was intended to work with.

  - Forward Area Air Defense Command, Control, and Intelligence System Was Expected to Counter the Numerous Fixed-Wing Soviet Aircraft. The GAO explained that the Army's post-cold war air defense strategy for the forward area envisions that Air Force fighter aircraft will counter the fast-moving fixed-wing threat, while the Army will defend against slow-moving helicopters and unmanned aerial vehicles. The GAO concluded that the diminished numbers and different types of aircraft the forward area air defense command, control, and intelligence system is expected to counter, raise questions about requirements, such as the number of aircraft a sensor must be able to track at one time or the range required to detect the aircraft.

  - Weapon Systems Intended to Work With Forward Area Air Defense Command, Control, and Intelligence System, Have Changed. The GAO pointed out that to date, the Army has fielded only one of the three original planned weapons, the line-of-sight-rear. The GAO observed that this weapon, the Avenger, was designed to use ground-based sensor data to protect rear assets primarily from attacks by fixed-wing aircraft. The GAO also observed that even the Avenger system sustained funding cuts in the FY 1995 budget planning efforts, and the Army does not plan to buy additional Avengers after FY 1995.

    The GAO observed that the two original weapons--non-line-of-sight and line-of-sight-forward--were canceled because of cost concerns and problems during development. The GAO pointed out that the Army has not developed a replacement for non-line-of-sight. The GAO observed that instead of line-of-sight, the air defense antitank system, the Army has fielded the Bradley Stinger Fighting Vehicle carrying teams of soldiers with shoulder-fired Stinger missiles. The GAO pointed out that these are in addition to teams of foot soldiers equipped with binoculars and shoulder-fired Stinger missiles. The GAO concluded that these drastic changes raise serious concerns about whether the

Now on pp. 2-6.

forward area air defense system command, control, and intelligence requirements should be the same as originally planned. The GAO further concluded that it may be premature to commit to the planned development of sophisticated software. (pp. 3-7/GAO Draft Report)

See comment 1.

DoD Response: Partially concur. As discussed in our response to Finding B, the Army has updated the requirements for the Forward Area Air Defense Command and Control System based upon the new threat and reduced air defense weapons.

See comment 3.

It is the DoD position that the requirements that were outlined in the original requirements document are still valid.

See comment 3.

Furthermore, the Forward Area Air Defense Command and Control System Threat Assessment Report, dated October 1993, has modified the threat to include a greater use of rotary wing aircraft by third world countries in regional threat environments as well as the proliferation of reconnaissance, surveillance, and target acquisition platforms and lethal unmanned aerial vehicles. It is the DoD position that even though, the Air Force fighter aircraft will encounter the fastmoving, fixed wing threat, the air defense radars will still be required to track these aircraft in order to provide the ground commanders with overall situational awareness. In addition, the lower radar cross-section aircraft defined in the System Threat Assessment Report will also require an accurate three dimensional radar. The Ground Based Sensor is the system that is being developed to meet these requirements.

See comment 4.

Current doctrine identifies that the Avenger mission has expanded to include flank protection of maneuver units and screening of forward elements. This requires engagement of reconnaissance, surveillance, and target acquisition platforms before the enemy can acquire needed information. The ground based sensor is needed to detect and acquire these platforms.

See comment 4.

The DoD agrees that the Army has fielded the Bradley Stinger Fighting Vehicle, carrying teams of soldiers with shoulder-fired weapons, to replace the two weapons systems that were cancelled. However, the Army is planning to enhance the Bradley Stinger Fighting Vehicle by mounting an avenger missile pod in place of the anti-tank missile pod and integrate the Forward Area Air Defense Command and Control System with that to allow quicker, more accurate acquisition and engagement of current threat platforms.

See comment 5.

The Department disagrees that it will be premature to commit to the planned development of sophisticated software. The Army has already developed and paid for the Block I and II software for the system. The Block I software and associated Ground Based Sensor System has already proven itself to be operationally effective and has been endorsed by the Commanding General, 24th Infantry Division, the Commanding General, 101st Airborne Assault Division, and the Commanding General of V Corps in Europe. The unacceptable alternative is to go back to the binoculars and voice radio for air defense.

- **FINDING D: Army Has Not Updated Forward Area Air Defense System Command, Control, and Intelligence Requirements.** The GAO asserted that the Army has not responded to changes in the threat or weapon systems by updating requirements for the forward area air defense system command, control, and intelligence system. The GAO noted that during a prior review (OSD Case 9375) of ground-based sensor, Army air defense school officials indicated that they planned to re-examine the entire forward area air defense system concept and recommend solutions in a Division Air Defense Study. The GAO observed that instead, the study, conducted in 1993, focused on the forward area air defense system weapon system capabilities and did not update the forward area air defense command, control, and intelligence system requirements, because of time constraints and a lack of resources. The GAO pointed out that according to the study director and forward area air defense command, control, and intelligence system project manager, they were relying on an upcoming forward area air defense system command, control, and intelligence cost and operational effectiveness analysis to assess requirements.

  The GAO asserted that according to DoD Instruction 5000.2, the purpose of a cost and operational effectiveness analysis is not to establish or reassess requirements, but to identify the advantages and disadvantages of alternatives being considered to meet recognized defense needs. The GAO further asserted that a requirements study, on the other hand, would allow the Army to reassess its need for a forward area air defense command, control, and intelligence system in view of threat and weapon system changes. The GAO emphasized that DoD 5000.2 mandates updates to system requirements at key decision points during development and acquisition. The GAO asserted that one of the major intents for documenting requirements is to avoid premature

Now on p. 7.

commitment to a system-specific solution. (pp. 7-8/GAO Draft Report)

See comment 1.

DoD Response: Nonconcur. It is the DoD position that requirements for the Forward Area Air Defense Command and Control system need not be updated to reflect the current threat and weapons situation. The status of updating requirements for the Forward Area Air Defense Command and Control System were discussed in our response to Finding B. In addition, in the DoD response to OSD Case 9375, the DoD pointed out that the Army did conduct the Division Air Defense Study to determine the requirement for low level air defense in the current threat environment. Although the study did not update the requirements for the Forward Area Air Defense Command and Control System, the Block I and II requirements and resulting capabilities, were fully considered and found essential for effective air defense operations in a post cold war environment and threat. Additionally, the Department had directed the Army to conduct a cost and operational effectiveness analysis prior to the start of the Division Air Defense Study. Although, the study director did not concentrate on validating requirements for the Forward Area Air Defense Command and Control System as, in fact, it was planned to do this during the DoD directed cost and operational effectiveness analysis, the Department supported this approach.

See comment 2.

See comment 6.

See comment 7.

The Department agrees with the purpose of a cost and operational effectiveness analysis as identified in DoD Instruction 5000.2. However, the Department does not agree that a detailed cost and operational effectiveness analysis cannot be used to show the value of a detection and command and control system to the overall Forward Area Air Defense System. It is the DoD position that regardless of the weapons systems being deployed, the need for a good detection and command and control system could be justified through means of a cost and operational effectiveness analysis. The DoD Instruction 5000.2 only requires an update of the cost and operational effectiveness analysis at a Milestone III decision. The Department has tasked the Army to perform one with new guidance prior to the Milestone-III decision for the Forward Area Air Defense Command and Control System and associated Ground Based Sensor. Additionally, it is the DoD position that the Division Air Defense Study validated the need for a Forward Area Air Defense Command and Control System to support forward area air defense requirements in the new post cold

See comment 2.

See comment 1.

See comment 2.

war environment and reduced weapons situation. However, the specific requirements for the system must be further defined as outlined in the Army actions to accomplish the requirements update as discussed in Finding B.

- **FINDING E: Army Was Not Following DoD Procurement Guidance.** The GAO concluded that the Army has not always followed DoD guidance for procuring systems, and there is some doubt the Army will adhere to that guidance with the forward area air defense system command, control, and intelligence. The GAO noted that in 1993, the GAO reported that the Army was developing and planned to procure the ground-based sensor without: (1) a cost and operational effectiveness analysis to determine its suitability; and (2) completing operational testing. The GAO pointed out that the DoD response to that report indicated that the DoD: (1) expected the Army to complete a cost and operational effectiveness analysis by December 1994; and (2) delayed funding initial production of the ground-based sensor for one year to allow time to complete initial operational testing of the integrated system.

  The GAO, nevertheless, reported that the Army plans to award a low-rate production contract before either the cost and operational effectiveness analysis or testing were completed. The GAO noted that in April 1994, during the current review, the Forward Area Air Defense System Ground-based Sensor Product Office decided to delay awarding a $51 million low-rate production contract from November 1994 to January 1995 to comply with DoD direction. The GAO noted that a cost and operational effectiveness analysis and operational testing are expected to be completed in December 1994. The GAO asserted, however, it is still uncertain that the cost and operational effectiveness analysis and operational testing will remain on schedule.

  The GAO asserted that the Army does not have a cost and operational effectiveness analysis to support acquisition of the ground-based sensor, although one is required at acquisition milestones. The GAO found that the Army began a cost and operational effectiveness analysis on the ground-based sensor in April 1990, but suspended it in March 1992 because of changes in the threat and weapon systems. The GAO pointed out that a Directorate of Combat Developments, Army Air Defense Artillery School, representative stated that a cost and operational effectiveness analysis for the ground-based sensor was not feasible until future air

Now on pp. 7-8.

See comment 8.

defense needs are defined. The GAO also noted that the Army expected air defense needs would be updated in the Division Air Defense Study. The GAO noted that did not happen. (pp. 9-10/GAO Draft Report)

DoD Response: Nonconcur. The Department strongly disagrees that there is some doubt the Army will adhere to the guidance with the forward area air defense system command and control system. The Department has been monitoring this system through the Defense Acquisition Executive Summary, and has had no indication that Department guidance is not being followed--unless mandated by funding cuts from the Congress. The Forward Area Air Defense System Command and Control System's cost and operational effectiveness analysis will be completed prior to the Army's decision to award the Low Rate Initial Production contract. It is the Department's position that this will suffice as a cost and operational effectiveness analysis for the Ground Based Sensor since it includes appropriate alternatives to judge the need for the Ground Based Sensor versus the Light and Special Division Interim Sensor, as well as against other alternatives.

- **FINDING F**: **Army Continues to Acquire System Despite Changes**. The GAO reported that regardless of the diminished threat and changes to the weapon systems, the Army is fielding Block I, an interim configuration of the forward area air defense command, control, and intelligence system, to light and special divisions. The GAO observed that the full-scale production decision is planned for March 1995 for the ground-based sensor and Block II of the forward area air defense command, control, and intelligence system. The GAO noted that Block I includes the computer hardware and basic software to interface with an interim sensor to detect aircraft and transmit air track data via an interim radio system. The GAO reported that in September 1993, the 101st Airborne Division, Fort Campbell, Kentucky, accepted the first Block I system. The GAO observed that the Army plans to field additional Block I systems to the 10th Mountain and 2nd Infantry Divisions in FY 1995 and to the 82nd Airborne Division in FY 1996.

  The GAO reported that Block II, another interim system, will build upon the basic capabilities in Block I, with the primary enhancements being improved software and the ground-based sensor instead of the interim sensor. The GAO noted that the Army considers Block III to be the

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objective forward area air defense command, control, and intelligence system with sophisticated software and aircraft identification capabilities. The GAO further noted that Block IV is a preplanned product improvement to further enhance communications and air battle management. The GAO asserted that the Army has not established firm cost estimates or timetables for Blocks III and IV. (pp. 10-11/GAO Draft Report)

Now on p. 8.

DoD Response: Nonconcur. The Army was authorized to deploy four of the Block I systems as a Low-Rate Initial Production quantity to support testing and development of the Block II systems. This was authorized in a January 11, 1993 memorandum announcing the results of a Department review of the system and signed by the Under Secretary of Defense for Acquisition. The Block I system is on schedule, under projected budget, and has performed satisfactorily during initial testing and demonstrations. The system fielded to the 101st Airborne Division has been endorsed by the Division Commander as being effective to support the Air Defense needs of the Division. In addition, the software development of the Block II system is completed and actions are ongoing in preparation for the upcoming operational testing in November 1994 and the associated Milestone III decision by the Defense Acquisition Board in April 1995. As stated in Finding B, despite a diminished threat and air defense weapons reduction, the requirements for the system are valid and the program should proceed as scheduled.

See comment 9.

See comment 1.
See comment 2.

The Block II is scheduled for a Milestone III decision in April 1995. This schedule will provide time for the Army to update the requirements and conduct cost and effectiveness analysis prior to the Milestone III review. The Army is required to complete a cost and operational effectiveness analysis on the Block III prior to the Milestone III decision for the Block II. This is scheduled to be completed in October 1994. The DoD agrees that cost estimates and timetables for Block III and IV need to be definitized and established in the Acquisition Program Baseline for the Blocks III and IV and this will be done in the Operational Requirements Document that is in staffing in the Army. It is the Department's position that this is not sufficient justification for not proceeding with the Block I and Block II efforts as scheduled.

See comment 9.

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RECOMMENDATIONS

- **RECOMMENDATION 1**: The GAO recommended that the Secretary of Defense direct the Secretary of the Army to defer the currently planned low-rate initial production and initial operational testing until the Army (1) updates the requirements for both the ground-based sensor and the forward area air defense command, control, and intelligence system and (2) selects the best solution for satisfying the updated requirements based on a cost and operational effectiveness analysis. (p. 11/GAO Draft Report)

Now on pp. 8-9.

DoD Response: Non concur. As stated in the DoD response to Finding B, the Army has validated the requirements for the Block I and Block II system for the Forward Area Air Defense Command and Control System based upon the changed threat and reduced air defense weapons. Both the Block I and Block II software development for the Forward Area Air Defense Command and Control system have been completed and testing and fielding should not be delayed until the Army completes staffing of the Operational Requirements Document. Additionally, the system is on schedule with guidance provided by the Department in management of the system as a major defense acquisition program. Both the Forward Area Air Defense Command and Control System and the Ground Based Sensor System are considered under the purview of the Defense Acquisition Board. The Army will complete a cost and operational effectiveness analysis prior to the Milestone III decision review in April 1995.

See comment 1.

See comment 2.

See comment 6.

See comment 10.

- **RECOMMENDATION 2**: The GAO recommended that the Army should be required to complete initial operational testing of the selected system (FAADC2I) prior to low-rate production. (p. 11/GAO Draft Report)

Now on pp. 8-9.

DoD Response: Nonconcur. The Ground Based Sensor is scheduled to undergo Initial Operational Testing as a part of the Forward Area Air Defense Command, Control, and Intelligence operational test in November 1994. The Army plans to use the emerging results from the Initial Operational Test and Evaluation as the basis to make the low-rate production decision to procure limited numbers of

See comment 8.

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See comment 11.

the Ground Based Sensor to support training needs. The Defense Acquisition Board will review the Ground Based Sensor Program as a component of the Forward Area Air Defense Command and Control System in April 1995 for the Milestone III decision authorization. As a part of this review, the Department will look at the low-rate initial production situation. The Department supports this acquisition strategy.

The following are GAO's comments on the Department of Defense's (DOD) letter dated August 18, 1994.

GAO Comments

1. Our concern is that the requirements for the forward area air defense (FAAD) command, control, and intelligence (C2I) system, including the ground-based sensor (GBS), have not been updated. As stated in our report, the Army planned such a requirements update in the Division Air Defense Study. However, the study did not specifically address FAAD C2I; it focused on the weapon system capabilities. In response to DOD's comments, we examined the Army's "War Fighting Lens Analysis" and discussed it with Army and DOD officials. We found that while the "War Fighting Lens Analysis" did revalidate the need for FAAD, it did not revalidate or update the specific FAAD C2I system requirements. Also, the upgrade of the Required Operational Capability into an Operational Requirements Document is essentially a format conversion and does not update requirements. The fact that the requirements outlined in the original requirements document were not changed is discussed in DOD's response to Finding C. Further, in a January 4, 1993, memorandum, DOD told the Army that it was concerned about requirements. For example, DOD stated, "The demise of the Warsaw Pact may have a significant impact on the performance needed in a FAAD C2I system . . . . However, the requirements have not yet been updated." The appropriate time to update the requirements would have been during the Division Air Defense Study. But, as mentioned in our report, this was not done.

2. We agree that a good cost and operational effectiveness analysis (COEA) can be used to show the value that good target detection/communications provide to the FAAD C2I system. However, as stated in our report, the purpose of a COEA is to evaluate alternatives to meet established requirements, which DOD Instruction 5000.2 requires to be updated at key decision points during development and acquisition. DOD Instruction 5000.2 further states that one of the major intents for documenting requirements is to avoid premature commitment to a system-specific solution. We recognize that the COEA guidance provided by DOD provides for analysis of alternatives. However, these alternatives are different variations of using the GBS and the Light and Special Division Interim Sensor (LSDIS). Our point is that the Army needs to develop and update an analytically based list of definitive requirements that a post-Cold War air defense system should have. Relying on a COEA without updated requirements could result in the Army prematurely committing to a system-specific solution.

3. As discussed above, the Army has not updated FAAD C2I system requirements. However, it seems inconceivable that the original requirements, set in 1986 for a Cold War threat, would not have changed in some way because of (1) the current very different and diminished threat and (2) the more limited set of weapon systems the FAAD C2I system will work with. Even so, DOD was not able to provide us with an analysis supporting its position that the requirements remain the same. Also, as previously mentioned, this was not done in the Division Air Defense Study.

We agree that the threat has changed, and the change should have influenced sensor requirements. We would have expected the Division Air Defense Study to have considered these changes and their influence on FAAD C2I system requirements in an analytical framework. However, this was not done. DOD's comment that the GBS is the system being developed to meet these requirements is specifically what DOD guidance is seeking to prohibit when it states that the services should document requirements to avoid premature commitment to a system-specific solution.

4. DOD's comment again assumes the GBS is the solution without an analytical basis. For example, if the Avenger is now required to be more maneuverable, analysis might reveal that a more maneuverable, less sophisticated air defense system meets current requirements. Planned enhancements to the Bradley Stinger Fighting Vehicle are currently unfunded.

5. We recognize that the Army has already invested in and developed software for the FAAD C2I system; these are sunk costs and efforts. However, a COEA performed using properly updated system requirements may identify more cost-effective alternatives than the currently selected FAAD C2I system. Additionally, DOD's comment about the unacceptable alternative of going back to binoculars and voice radio for air defense implies that there are only two possible outcomes to the COEA process and completely disregards the existence of the LSDIS and other available sensors.

6. We disagree that the Division Air Defense Study "fully considered and found essential" the Block I and II requirements and resulting capabilities. However, the study, conducted in 1993, focused on FAAD weapon systems capabilities and did not update the FAAD C2I system requirements. According to the Division Air Defense Study Director, the Army did not assess the FAAD C2I system requirements in the study because of time and resource constraints. The study director and FAAD C2I system project

manager stated they were relying on an upcoming FAAD C2I COEA to assess requirements. However, according to DOD Instruction 5000.2, the purpose of a COEA is not to establish or reassess requirements, but to identify the advantages and disadvantages of alternatives being considered to meet recognized defense needs. In all analyses, the study assumed the existence of the objective FAAD C2I system. Perhaps this was good enough to establish the need for some sort of automated command and control system, but, in our opinion, it was not sufficient for drawing conclusions regarding specific requirements for that system.

7. DOD's position that ". . . the [Division Air Defense] study director did not concentrate on validating requirements for the Forward Area Air Defense Command and Control System as, in fact, it was planned to do this during the DOD directed cost and operational effectiveness analysis," contradicts DOD's position in its response to Finding B that the purpose of a COEA is not to establish system requirements. DOD asserts that FAAD C2I system requirements have been updated. DOD, on the other hand, states that the COEA, ". . . will provide an analytical basis for updated requirements . . ." (see p. 17, para. 2), implying that requirements have not been updated.

8. As an indication that DOD has not managed the program as effectively as possible, we noted that a January 4, 1993, memorandum from the DOD to the Army stated that the influence of a reduction in the threat and FAAD C2I requirements needed to be studied. However, this was not done. As a second example, in an October 13, 1993, letter from DOD to GAO, DOD said that it would defer the initial production decision for the GBS to allow time for sufficient test and evaluation of the integrated system. However, the Army is now planning to make a low-rate initial production decision before the results from the integrated tests are completed and evaluated. Also, DOD's assertion that the Army is managing the program in accordance with DOD guidance is contradicted by the fact that the Army is planning for low-rate production for a reason clearly not within the purposes given for initiating low-rate production in 10 U.S.C. 2400. Additionally, the COEA, the initial operational test and evaluation, and the Defense Acquisition Board meeting have all slipped, lending credence to our concerns about the uncertainty that future efforts will remain on schedule.

9. We did recognize the initial fielding of a Block I system. Our point is that the Army continues to acquire a system without definitizing requirements. Also, the DOD contradicted itself by asserting that the schedule for a full-scale production decision—the milestone III decision—in April 1995 provides time for the Army to "update requirements." This indicates that

requirements have not yet been updated. We agree that a requirements update, along with the COEA, should be accomplished prior to the full-scale production decision.

10. We continue to believe that the Army needs to establish definitive requirements for the FAAD C2I system, including the GBS, before proceeding with acquisition. We believe, and we have stated in the report and in comments above, that a systematic analysis of requirements is essential to the acquisition of this system.

11. We have changed our report and recommendation to reflect DOD's comments that the low-rate initial production decision is now scheduled for December 1, 1994, and a full-scale production decision is scheduled for April 1995. Given these changes and potential problems with meeting the revised milestones, we have changed our recommendation to state that the low-rate initial production decision should be deleted entirely, and DOD and the Army should wait for the full-scale production decision, a delay of a few months.

DOD stated that it wanted to begin low-rate initial production to procure limited numbers of the GBS to support training needs. However, providing for training needs is not one of the three purposes specified in 10 U.S.C. 2400 for initiating low-rate initial production. The three purposes are (1) to provide production configured or representative articles for operational test and evaluation, (2) establish an initial production base for the system, and (3) permit an orderly increase in the production rate for the system sufficient to lead to full-rate production upon the successful completion of operational test and evaluation. The GBS low-rate initial production decision will not meet any of these criteria because the Army already has representative items for test. Also, the system is composed of nondevelopmental items already in production. Therefore, deleting low-rate initial production will not hurt development of the system. Also, the Army does have the LSDIS and other sensors.

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