Audit Report

OFFICE OF THE INSPECTOR GENERAL

OPERATIONAL TEST AND EVALUATION RESULTS FOR THE ADVANCED FIELD ARTILLERY TACTICAL DATA SYSTEM

Report No. 96-061 January 23, 1996

Department of Defense

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Acronyms

AFATDS	Advanced Field Artillery Tactical Data System
ASARC	Army Systems Acquisition Review Council
DOT&E	Director, Operational Test and Evaluation
IOT&E	Initial Operational Test and Evaluation
OPTEC	Operational Test and Evaluation Command

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884

Report No. 96-061 **January 23, 1996**

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION AND TECHNOLOGY
DIRECTOR, OPERATIONAL TEST AND EVALUATION
AUDITOR GENERAL, DEPARTMENT OF THE ARMY

SUBJECT: Audit Report on the Operational Test and Evaluation Results for the Advanced Field Artillery Tactical Data System (Project No. 6AE-8005)

Introduction

We are providing this report for your information and use. We performed this audit in response to an allegation made to the DoD Hotline that the Army Operational Test and Evaluation Command (OPTEC) did not inform the Army Systems Acquisition Review Council (ASARC) that the Advanced Field Artillery Tactical Data System (AFATDS) did not meet its user requirements during initial operational test and evaluation (IOT&E). Specifically, the complainant alleged that the test and evaluation report showed that AFATDS met 100 percent of the critical operational issues and criteria when only 50 percent of the critical operational issues and criteria were met during the IOT&E. Enclosure 1 provides definitions of technical terms used in this report.

Audit Results

The results of our review did not substantiate the allegation. The OPTEC fully disclosed AFATDS performance shortcomings regarding the critical operational issues and criteria in its draft test and evaluation report with which the Army Test and Experimentation Command concurred on December 5, 1995. This draft report, provided to the preliminary ASARC, showed that the AFATDS performance did not satisfy two of the four critical operational issues and identified corrective actions that must be taken before full materiel release. The OPTEC finalized the test and evaluation report on December 15, 1995. The Director, Operational Test and Evaluation (DOT&E), will fully consider the final test and evaluation report when he prepares the Beyond Low-Rate Initial Production Report in accordance with United States Code, title 10, section 2399, "Operational Test and Evaluation of Defense Acquisition Programs." The DOT&E plans to issue the Beyond Low-Rate Initial Production Report by late January 1996. In this context, personnel from the Office of the Assistant Secretary of the Army (Research, Development and Acquisition) said that AFATDS production hardware quantities will be procured after DOT&E submits his Beyond Low-Rate Initial Production Report to the Secretary of Defense and Congress.

Objective

The audit objective was to evaluate an allegation made to the DoD Hotline concerning whether OPTEC, the operational evaluator, accurately disclosed the results of AFATDS initial operational test and evaluation results in its draft test and evaluation report.

Scope

We conducted this audit during December 1995 and reviewed data dated from December 1994 through December 1995. To accomplish the objective, we:

o examined the firm fixed-price contract DAAB07-94-C-N853 with General Telephone and Electronics, Government Systems Division, Taunton, Massachusetts, and discussed the firm fixed-price contract DAAB07-88-C-J015 with Miltope Corporation, Montgomery, Alabama, to be used to procure AFATDS hardware;

o reviewed the AFATDS Modified Integrated Program Summary, December 1995, and supporting charts;

o reviewed the OPTEC draft Test and Evaluation Report with which the Army Test and Experimentation Command concurred on December 5, 1995; and

o discussed issues relating to the effectiveness of the AFATDS initial operational test results with personnel from the Offices of the Assistant Secretary of Defense (Command, Control, Communications and Intelligence); the Assistant Secretary of the Army (Research, Development and Acquisition); the DOT&E; the Director, Test, Systems Engineering and Evaluation; the OPTEC; the AFATDS Program, Fort Monmouth, New Jersey; and the Common Hardware and Software Program, Fort Monmouth, New Jersey.

Methodology

We conducted this program audit in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD. We did not rely on computer-processed data to develop conclusions on this audit because the areas reviewed did not contain computer-processed data. A technical expert from the Software Engineering Branch, Technical Assessment Division, Inspector General, DoD, and a consultant from the Acquisition Management Directorate, Inspector General, DoD, assisted in the review of the AFATDS initial operational test and evaluation results and associated report. The technical expert and the consultant, having engineering, test and evaluation, and manufacturing experience, accompanied the auditors on their visits to the Offices of the DOT&E; the Assistant Secretary of the Army (Research, Development and Acquisition); and the OPTEC.

Management Control Program

DoD Directive 5010.38, "Internal Management Control Program," April 14, 1987, requires DoD organizations to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the management controls.

We did not review the management control program because Inspector General, DoD, Report No. 96-028, "Implementation of the DoD Management Control Program for Major Defense Acquisition Programs," November 28, 1995, evaluated the effectiveness of the management control program that the Defense Acquisition Executive and the Service Acquisition Executives used for major Defense acquisition programs. The report concluded that the acquisition community had not effectively integrated DoD Management Control Program requirements into its management assessment and reporting processes. The report made recommendations to the Under Secretary of Defense for Acquisition and Technology and the Under Secretary of Defense (Comptroller) to correct the situation.

Prior Audit Coverage

During the last 5 years, the General Accounting Office and the Army Audit Agency have not issued reports addressing AFATDS initial operational test and evaluation. However, the Inspector General, DoD, issued a report in May 1994 that addressed AFATDS initial operational test and evaluation. We synopsized the report in Enclosure 2.

Audit Background

Advanced Field Artillery Tactical Data System. The Army AFATDS, an acquisition category IC program, is to provide an integrated battlefield management and decision support system designed to overcome the size, vulnerability, high sustainment cost, limited functionality, central processing, and training limitations of the Tactical Fire Direction System. The AFATDS is one of five battlefield automation systems of the Army Tactical Command and Control System. The AFATDS will automate 27 fire support functions, grouped in five fire support operational requirements: fire support execution, fire support planning, movement control, field artillery mission support, and field artillery fire direction operations. The AFATDS will utilize the evolving commercial computer technology selected for the Army Tactical Command and Control System architecture. The AFATDS hardware will include 1,652 tactical computer units; 3,762 lightweight computer units; and associated peripheral equipment.

In the December 31, 1994, Selected Acquisition Report, AFATDS total acquisition costs were estimated at $1.1 billion in then-year dollars of which about $519.6 million and $617.4 million are for development and procurement, respectively. The Army contracted with Magnavox Electronic Systems

Company, Fort Wayne, Indiana, to develop the system and plans to procure the hardware from General Telephone and Electronics, Government Systems Division, Taunton, Massachusetts, and Miltope Corporation, Montgomery, Alabama.

On December 13, 1995, the Assistant Secretary of the Army (Research, Development and Acquisition) made the Milestone III, Production Approval, decision for the AFATDS. He approved AFATDS:

o being type classified as Standard;

o proceeding into Phase III, Production and Deployment;

o being fielded to the Total Force; and

o being developed further through development and product improvement to reach the objective system.

The Assistant Secretary also stated that he is to be briefed before the AFATDS is fielded on the status of needed corrective actions that OPTEC identified.

Operational Test and Evaluation. The DoD Instruction 5000.2, "Defense Acquisition Policies and Procedures," February 23, 1991, part 8, "Test and Evaluation," contains operational test and evaluation policies. The Instruction states that the program office will structure operational test and evaluation programs to determine the operational effectiveness and suitability of a system under realistic combat conditions and whether the minimum acceptable operational performance requirements as specified in the operational requirements document have been satisfied.

Beyond Low-Rate Initial Production. The DoD Instruction 5000.2 requires the DOT&E to submit a written report to the Secretary of Defense and Congress before an acquisition category I program can proceed beyond low-rate initial production. United States Code, title 10, section 2399, "Operational Test and Evaluation of Defense Acquisition Programs," requires the report to assess:

o the adequacy of the conducted operational test and evaluation and

o whether the test and evaluation results confirm that the items or components tested are operationally effective and suitable for use in combat by typical military users.

Operational Test and Evaluation Report. Army Regulation 73-1, "Test and Evaluation," February 27, 1995, requires that:

o the operational tester and independent operational evaluator prepare the operational test and evaluation report and

o all operational test and evaluation reports be provided to the milestone decision review body.

The independent operational evaluator normally briefs operational test and evaluation reports directly to the ASARC.

Discussion

Our review did not substantiate the allegation made to the DoD Hotline that OPTEC did not inform the ASARC that the AFATDS did not meet its user requirements during IOT&E. The OPTEC fully disclosed AFATDS initial operational test and evaluation results to the ASARC in its draft test and evaluation report.

Test and Evaluation Report. To determine whether OPTEC, the operational evaluator, accurately disclosed the results of AFATDS initial operational test and evaluation results in its draft test and evaluation report, we reviewed the OPTEC draft report with which the Army Test and Experimentation Command concurred on December 5, 1995. Our technical experts conducted a technical review of the IOT&E results as they related to the critical operational issues and criteria. To conduct the review, our technical experts used the OPTEC draft test and evaluation report and the OPTEC test and evaluation plan used to conduct the IOT&E from August through September 1995. Our technical experts concluded that the OPTEC fully disclosed AFATDS performance shortcomings regarding the critical operational issues and criteria. The draft report that OPTEC provided to the preliminary ASARC showed that the AFATDS performance did not satisfy two of the four critical operational issues.* The draft report also identified corrective actions that must be taken before full materiel release. The draft report stated that "The AFATDS system is operationally effective and suitable with qualifications. The qualifications must be corrected prior to full materiel release." The qualifications included problems with low-level alerts, attack guidance, power sources, and target processing. The draft report discussed those qualifications in detail, including recommendations to improve the system before fielding. On December 15, 1995, OPTEC issued its final test and evaluation report with the same conclusion and recommendations as the draft report on the AFATDS initial operational test and evaluation results.

Director, Operational Test and Evaluation, Assessment. Cognizant personnel from the Office of the DOT&E informed us that DOT&E will fully consider the OPTEC final AFATDS test and evaluation report when preparing the Beyond Low-Rate Initial Production Report in accordance with United States Code, title 10, section 2399. The DOT&E plans to issue the Beyond Low-Rate Initial Production Report by late January 1996.

Procurement of Production Hardware. Cognizant personnel from the Office of the Assistant Secretary of the Army (Research, Development and Acquisition) said that the AFATDS Program Office cannot procure additional

*Enclosure 3 shows the four critical operational issues and related criteria.

AFATDS production hardware quantities until DOT&E submits the AFATDS Beyond Low-Rate Initial Production Report to the Secretary of Defense and Congress.

Conclusion

The OPTEC accurately informed the ASARC that the AFATDS only met 50 percent of the critical operational issues and related criteria during the IOT&E. Accordingly, the results of our review did not substantiate the allegation made to the DoD Hotline.

Management Comments

We provided a draft of this report to you on December 22, 1995. Because the report contains no findings and recommendations, written comments were not required and none were received. Therefore, we are publishing this report in final form.

We appreciate the courtesies extended to the audit staff. If you have questions on this report, please contact Mr. John E. Meling, Audit Program Director, at (703) 604-9091 (DSN 664-9091) or Mr. Jack D. Snider, Audit Project Manager, at (703) 604-9087 (DSN 664-9087). Enclosure 4 lists the distribution of this report. The audit team members are listed inside the back cover.

David K. Steensma

David K. Steensma
Deputy Assistant Inspector General
for Auditing

Enclosures

Definitions of Technical Terms

Acquisition Category I. An acquisition category I designation is issued to all major Defense acquisition programs that have an eventual total expenditure for research, development, acquisition, and evaluation of more than $300 million in FY 1990 constant dollars or an eventual total expenditure for procurement of more than $1.8 billion in FY 1990 constant dollars. Acquisition category I programs are comprised of two designations depending on the milestone decision authority: ID and IC. For acquisition category ID programs, the Under Secretary of Defense for Acquisition and Technology is the milestone decision authority. For acquisition category IC programs, the cognizant DoD Component head or, if delegated by the Component head, the Component acquisition executive is the milestone decision authority.

Army Systems Acquisition Review Council. The Secretary of the Army established this council as an advisory body on Army system acquisitions. The council is normally chaired by the Assistant Secretary of the Army (Research, Development and Acquisition) and is similar in functional composition, responsibilities, and operation to the Defense Acquisition Board.

Critical Operational Issue. A key operational effectiveness or operational suitability issue that must be examined in operational test and evaluation to determine the system's capability to perform its mission. Normally phrased as a question to be answered in evaluating a system's operational effectiveness or operational suitability or both.

Initial Operational Test and Evaluation. Operational test and evaluation conducted on production or production-representative articles to support the decision to proceed beyond low-rate initial production. The initial operational test and evaluation is conducted to provide a valid estimate of expected system operational effectiveness and operational suitability.

Low-Rate Initial Production. The production of a system in limited quantities to provide articles for operational test and evaluation, to establish an initial production base, and to permit an orderly increase in the production rate sufficient to lead to full-rate production upon successful completion of operational testing.

Operational Requirements Document. Documents the users' objectives and minimum acceptable requirements for operational performance of a proposed concept or system.

Operational Test and Evaluation. The field test, under realistic conditions, of any item or key component of weapons, equipment, or munitions to determine the effectiveness and suitability of the weapons, equipment, or munitions for use in combat by typical military users and the evaluation of those test results.

Tactical Fire Direction System. The Tactical Fire Direction System (the System) has been provided to all heavy divisions and corps of the active force. The System consists of two types of central computers, providing field artillery

fire planning and tactical fire control, and a remote terminal, providing communications with the central computers. Tactical fire control includes evaluating targets, selecting units to fire, munitions, and volume of fire.

Test and Evaluation Plan. The plan represents the OPTEC approach to the initial operational test and evaluation of the operational effectiveness and suitability of the AFATDS.

Type Classification. Identifies the life-cycle status of a materiel system after a production decision by the assignment of a type classification designation and records the status of a materiel system in relation to its overall life history as a guide to procurement, authorization, logistical support, asset, and readiness reporting. Type classified as "Standard" means that the system satisfies DoD requirements for procurement.

Prior Audit

The Inspector General, DoD, issued a report evaluating the effectiveness of the AFATDS milestone review process. Report No. 94-115, "Milestone Review Process for the Advanced Field Artillery Tactical Data System," May 27, 1994, stated that the AFATDS Program was not ready to proceed into the production and deployment phase of the acquisition process. The AFATDS software to be deployed lacked critical capabilities necessary to fulfill user requirements, including communication with other user systems. Subsequent versions of AFATDS software, potentially capable of meeting user requirements, did not have a dedicated engineering and manufacturing development phase to achieve production hardware and software configurations suitable for deployment. As a result, the Army could spend $187.2 million for hardware that does not meet requirements, spend $4.6 million for an initial operational test and evaluation that will not prove the AFATDS is ready for fielding, further delay the development of software, field software that does not meet user requirements, and support two systems to accomplish the same mission. In reference to the Milestone III decision and operational testing, the report recommended that the Under Secretary of Defense for Acquisition and Technology:

o cancel the Milestone III decision and hardware procurement for the initial version of software and

o require revision of the Test and Evaluation Master Plan (the Plan) to reflect the minimum operating requirements.

The Acting Director, Acquisition Program Integration, Office of the Under Secretary of Defense for Acquisition and Technology, responded to the final report. The Acting Director stated that:

o In March 1994, the Army decided to delay the ASARC review of Version 1 for Milestone III approval. The Army made the decision based on the results of technical and limited operational testing. The Army slipped the IOT&E into FY 1995 and, therefore, the ASARC review. The Milestone III decision for the AFATDS Program includes the decision for procurement of common hardware and deployment of the AFATDS software to meet AFATDS-user requirements throughout the Army. Since the IOT&E was rescheduled for FY 1995, the Army postponed the decision to procure the hardware for fielding and appropriately adjusted funding for the AFATDS Program.

o The Plan should reflect the minimum operating requirements of an approved operational requirements document. The current AFATDS Plan reflects the minimum operating requirements of the AFATDS operational requirements document. The AFATDS Program Manager is constantly reviewing the Plan and will update the Plan based upon test schedule changes.

Critical Operational Issues and Criteria

Critical Operational Issue (COI)	Criteria	Finding	Results
COI 1 Does AFATDS provide the flexibility and throughput to perform the fire support command, control, and communications mission in support of the maneuver commander?	1-1. Process and disseminate changes to commanders' guidance within 9.5 minutes.	Could not disseminate changes to time standard.	Ineffective[1]
	1-2. Process sensor data and prioritize targets.	Achieved 86 percent message-completion rate. Targeting functionality was adequate.	Effective
	1-3. Select optimum fire support asset.	Selected capable units to engage targets.	Effective
	1-4. Process 120 orders to fire per hour.	Exceeded threshold in 6 of 7 cases by a significant margin.	Effective
	1-5. Prepare two-phased fire support plan within 130 minutes.	Within threshold in all cases.	Effective
COI 2 Does AFATDS provide for the effective exchange of battlefield information necessary to implement the maneuver commander's battle plans and provide for efficient and timely fire support synchronization?	2-1. Interoperate with other field artillery systems and battlefield functional areas.	Achieved 100 percent message-completion rate with battlefield functional areas. Effective with field artillery systems, with some anomalies.	Interoperable[2]
COI 3 Does the AFATDS architecture provide survivability in the Airland Operations Environment?	3-1. Intranodal continuity of operations within 10 minutes.	Master workstation could assume slave functions to standard; however, slave workstation could not assume master functions.	Ineffective
	3-2. Internodal continuity of operations within 40 minutes.	Achieved 84 percent of cases to standard.	Effective
COI 4 Does the AFATDS architecture provide for supportability in an Airland Operations Environment?	4-1. Minimum essential fire support 90 percent of the time.	Exceeded threshold with 90 percent availability.	Suitable[3]

[1]The system did not attain specific mission requirements or criteria.
[2]The system is able to provide services or accept services from other systems, units, or forces and to use the services so exchanged to operate together effectively.
[3]The system design characteristics and planned logistics resources, including staffing, meet system peacetime readiness and wartime utilization requirements.

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Audit Team Members

The Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, DoD, prepared this report.

Donald E. Reed
John E. Meling
Jack D. Snider
Christopher E. Johnson
James C. Mc Cune
Garry D. Durfey
Mary Ann Hourclé
Teresa D. Bone