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Briefing Report to the Chairman, Subcommittee on Procurement and Military Nuclear Systems, Committee on Armed Services, House of Representatives

July 1989

COMMUNICATIONS

Mobile Subscriber Equipment Testing Issues and Army Improvement Plan

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GAO

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

National Security and
International Affairs Division

B-235515

July 6, 1989

The Honorable Les Aspin
Chairman, Subcommittee on Procurement
and Military Nuclear Systems
Committee on Armed Services
House of Representatives

Dear Mr. Chairman:

As requested, we monitored the Follow-on Operational Test and Evaluation for Mobile Subscriber Equipment (MSE), reviewed the MSE plan intended to correct performance problems identified in the test, and evaluated the Army's financial recourse if the problems are not corrected. Although we did not independently verify the test data generated by the agency responsible for testing MSE, the Army's Operational Test and Evaluation Agency (OTEA), we addressed three specific questions: (1) What qualifications did OTEA have to perform the test? (2) What level of independence did OTEA have for testing? (3) What test plans and procedures did OTEA use for the test? Answers to each of these specific questions are in appendix I. This letter summarizes our review. Appendix II describes our objectives, scope, and methodology.

Results in Brief

Based on the independent test performed by OTEA experts in accordance with an approved test plan, the Army concluded that MSE was significantly better than the current system. It identified five areas in which performance improvements were needed and, working with the contractor, it has developed a Corrective Action Plan to address the performance problems. Should MSE fail to meet all the performance requirements, the contract contains adequate provisions to protect the Army from paying the full contract price.

Background

MSE is a tactical area communications system intended to provide voice, facsimile, and secure data communications for mobile and stationary users throughout the corps area. The Army awarded General Telephone and Electronics, Needham, Massachusetts, a firm, fixed-price contract for the MSE system in December 1985. MSE could cost about $4 billion if five options are exercised as planned. Over an 8-year period, the Army plans to field MSE to provide area communications at corps and division levels throughout the Army, including active, reserve, and National Guard components. MSE's Follow-on Operational Test and Evaluation

was intended to determine its operational effectiveness and suitability for the Army's use.

MSE's Test Results and Performance Problems

Overall, OTEA concluded that MSE was operationally effective, operationally suitable, and significantly better than the current system. However, OTEA identified one major area in which MSE did not meet the Army's performance requirement—the desired grade of service/call completion rate was not achieved. OTEA also identified four areas in which improvements were needed to increase effectiveness: (1) the system control center's ability to manage the MSE system was adversely affected by its physical configuration and software limitations, (2) the communications-security procedures and tools were too cumbersome and complicated, (3) logistical support was limited, and (4) the basic training program was inadequate.

According to officials responsible for testing communications systems at both OTEA and the Office of the Secretary of Defense (Test and Evaluation), no single pass/fail test criteria existed that could determine if MSE or any other comparable system being tested by OTEA was operationally effective and suitable. OTEA reached its conclusions after applying military judgment to test findings that were based on MSE performance against (1) the system it was replacing and (2) the test criteria. The officials said that although MSE did not meet all of its test criteria, the user responses indicated that it was capable of supporting Army requirements and the test indicated it was better than the system it was replacing.

The Army Improvement Plan Is Designed to Respond to Performance Problems Identified in the Test

The Army and the contractor have jointly developed an MSE Corrective Action Plan to correct performance problems identified in the test. The plan consists of four "blocks" of improvements. Each block consists of two phases: (1) the incorporation of specified software and hardware improvements and (2) tests to measure the contractor's progress toward meeting performance requirements. The contractor has agreed in writing to implement the plan at no additional cost to the Army.

The MSE Corrective Action Plan is designed to improve the five problem areas identified during the test. Tests will follow each block of improvements to measure progress toward meeting performance requirements. The tests will be conducted at the contractor's facilities with equipment operated, maintained, and managed by the contractor. The contractor will perform the tests using Army-approved test plans, procedures, and

evaluation criteria. These tests are scheduled for June 1989, February 1990, August 1990, and February 1991. The Army plans to evaluate compliance with performance requirements after each of the tests.

In addition, OTEA plans to conduct two more Follow-on Evaluations to independently determine MSE compliance with Army performance requirements. OTEA's tests are scheduled for February 1990 and February 1991.

The Army Can Withhold Money If MSE Performance Problems Are Not Corrected

Because MSE did not perform satisfactorily in all areas during the Follow-on Operational Test and Evaluation, you asked us to determine whether the Army was financially protected if MSE cannot meet all of its performance requirements. Our analysis showed that the MSE contract provides adequate authority to protect the Army from paying the full contract price if the contractor cannot meet all of MSE's performance requirements. The Army's authority to reduce or withhold payments is contained in the MSE contract under the (1) MSE Corrective Action Plan, (2) progress payments clause, (3) termination clause, and (4) warranty.

Under the MSE Corrective Action Plan, funds could be withheld at the completion of each improvement block if the block requirements are not met. While the plan is in force from June 1989 to February 1991, up to $259 million of the $1,184 million in planned payments may be withheld from the contractor for problems identified in the test. (See table 1.)

Table 1: MSE Corrective Action Plan—Potential Withholdings

Dollars in millions

Block	Scheduled completion date	Potential withholdings
I	June 1989	$25
II	Feb. 1990	96
III	Aug. 1990	32
IV	Feb. 1991	106
Total		**$259**

After February 1991, the Corrective Action Plan will no longer be in effect and the Army can withhold additional payments through the MSE contract's withholding provisions. If the Army concludes that MSE failed OTEA's February 1991 Follow-on Evaluation, the MSE contract contains the normal contract provisions which allow the Army to reduce, withhold, or suspend payments. It is estimated that, as of March 1991, $1,460 million of the full contract price will not yet have been paid to

the contractor. (See table 2.) The $1,460 million is in addition to the $259 million available for potential withholding under the Corrective Action Plan.

Table 2: Projected March 1991 Potential Withholdings From Unspent Funds

Dollars in millions

Option year	Provided	Spent	Unspent
Basic	$63.0	$63.0	$0
1	335.3	335.3	0
2	870.0	870.0	0
3	930.5	607.3	323.2
4	912.5	464.5	448.0
5	938.9	250.4	688.5
6	0	0	0
Total	**$4,050.2**	**$2,590.5**	**$1,459.7**

Note: This table was developed by the Army MSE program office. Estimates are based on the amount of money projected to be provided by the Congress, but not spent by the MSE program office, as of March 1991. These unspent funds would be available for withholding.

Our analysis of the MSE contract warranty provisions indicates that it could protect the Army in the future if MSE performance problems persist. Specifically, the warranty provisions authorize the Army to have the contractor, at no cost to the Army, (1) repair or replace the defective item, (2) have a third party fix the problem at the contractor's expense, or (3) reduce MSE costs.

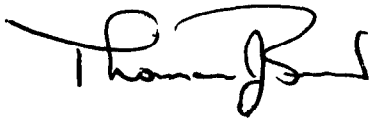
The Army will not know the results of the Corrective Action Plan nor the final Follow-on Evaluation until March 1991, at which time the Army will have paid the contractor an estimated $2.6 billion. However, MSE program officials are confident that they will be able to track contractor progress through evaluations to be conducted as a part of each block of the Corrective Action Plan as well as the Follow-on Evaluation schedule for February 1990. The officials said that OTEA's test had already demonstrated that MSE was operationally effective and suitable and better than the current communications system.

As requested, we did not obtain agency comments on this report. However, we discussed its contents with officials from the Office of the Secretary of Defense (Test and Evaluation) and the Department of the Army and have incorporated their comments where appropriate.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of the report. At that time we will send copies to the Secretaries of Defense and the Army and to interested parties and make copies available to other upon request.

Staff members who made major contributions to this report are listed in appendix III.

Sincerely yours,



Thomas J. Brew
Director, Command, Control,
Communications, and Intelligence Issues

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Abbreviations

MSE	Mobile Subscriber Equipment
OTEA	Operational Test and Evaluation Agency

OTEA's Ability to Perform the MSE Test

Army Regulation 10-4 provided OTEA with the responsibility and authority to evaluate and test Army systems. This included supervising the planning, execution, and reporting of operational testing for assigned major systems. According to the regulation, OTEA reports to the Chief of Staff, U.S. Army, and is to coordinate closely with, but remain independent of, the materiel and development communities.

The MSE Test and Evaluation Master Plan, approved by the Office of the Under Secretary of Defense (Test and Evaluation), specified that OTEA was responsible for providing the independent operational evaluation for the MSE program to assess the operational effectiveness and suitability of the MSE system, including the development and execution of a Follow-on Test and Evaluation Test Design Plan. To carry out that responsibility, OTEA established an MSE test directorate to design test plans, manage and control test operations, evaluate test data, and report on the evaluation results. OTEA's MSE test directorate was responsible for test operations, and data collection, entry, processing, and analysis, and for reports generation.

What Qualifications Did OTEA Have to Perform the Test?

We reviewed the qualifications of key OTEA officials assigned to the MSE test. We found that the top three test managers had the following qualifications.

- The test director had military specialties in tactical communications, operations research and systems analysis; possessed a master of science degree in operational research analysis; and had held positions as a tactical signal battalion commander, an operational test evaluator, a material systems analyst, and an operational systems analyst.
- The technical director had a master of science degree and doctorate of philosophy in physics; was chief of the effectiveness performance analysis and the test design and evaluation of artillery systems; had previously designed Army test plans and evaluations; and had directed the Army's corps-wide communications architecture study.
- The test evaluator had military specialties in tactical communications and communications engineering; possessed a bachelor of science degree in electronics engineering and a master of science degree in systems management; had attended additional graduate-level education in telecommunications engineering; and had held positions as an OTEA evaluator since 1985.

What Level of Independence Did OTEA Have to Perform the Test?

During our review, we noted the following examples of OTEA's independence necessary to conduct an independent test.

- OTEA's MSE test directorate was responsible for data collection, entry, processing, and analysis and for reports generation. OTEA established management procedures for document control, data flow, and quality control.
- OTEA established procedures over contractor access to the system during the test; contractor personnel were not permitted to attend daily test operations meetings.
- OTEA rejected a request from the program office to insert certain methodology in its Test Design Plan.
- OTEA analyzed the test results and prepared the test report without participation by the users or program office, according to OTEA officials.
- OTEA reported test results directly to the Under Secretary of the Army.

What Test Plans and Procedures Did OTEA Use for the Test?

Two major planning documents were used in preparing for the MSE test. The first document was the Test and Evaluation Master Plan, which was a broad plan that set out the test objectives, scope, responsibilities, resources, general criteria, and schedules. It was prepared by an Army group composed of the program's sponsor, combat developer, technical independent evaluator, operational tester/evaluator (OTEA), and logistician. It was approved by the Office of the Secretary of Defense in October 1987 as required by Army regulations. The second document was the MSE Test Design Plan which was used to conduct the test. In December 1987, OTEA completed the Test Design Plan, which encompassed the master plan requirements and also provided specific test requirements, criteria, and methodology used to perform the test.

During the test, OTEA tested and evaluated the MSE in accordance with the Office of the Secretary of Defense's approved Test and Evaluation Master Plan and the Test Design Plan. OTEA's report contains measurements and evaluations against the criteria specified in the test plans for acceptable performance and suitability in such areas as call completion rates, equipment set-up and tear-down times, reconnection time, and system operation restoral time after loss of service. In comparing the test plans against OTEA's test report, we found that all major test issues had been tested and evaluated.

Objectives, Scope, and Methodology

As requested, we monitored the Follow-on Operational Test and Evaluation for MSE, reviewed the MSE plan intended to correct performance problems identified in the test, and evaluated the Army's financial recourse if the problems are not corrected. Although we did not independently verify the test data generated by OTEA, we addressed three specific questions: (1) What qualifications did OTEA have to perform the test? (2) What level of independence did OTEA have for testing? (3) What test plans and procedures did OTEA use for the test?

Our review of MSE's Follow-on Operational Test and Evaluation was performed at the Army testing facility at Fort Hood, Texas. We reviewed OTEA's Test Design Plan and other documents related to both the operation and administration of the MSE test. We interviewed OTEA and 1st Cavalry Division personnel involved in planning, implementing, and reviewing the MSE test. We also monitored both the Follow-on Operational Test and Evaluation Operations and Data Authentication Group meetings. We interviewed OTEA management and operations personnel to determine if the contractor influenced the planning, operations, analysis, or reporting of test results.

We performed follow-up work at the Office of the Secretary of Defense and the MSE Information Office located at the Pentagon in Washington, D.C., and also performed work at OTEA headquarters in Northern Virginia. We compared test plans from the Office of the Secretary of Defense and OTEA to verify that the OTEA plan included the Office of the Secretary of Defense issues, criteria, and performance requirements. We reviewed OTEA's interim evaluation report and discussed its findings and conclusions with OTEA and Office of the Secretary of Defense officials to determine if the test conclusions were supported by test results.

In addition, we performed work at the MSE program office located at the Army Communications-Electronics Command, Fort Monmouth, New Jersey, where we interviewed MSE contracting officials and reviewed contract documents to determine (1) if the MSE contract provided adequate authority to withhold money from the contractor if MSE did not meet performance requirements and (2) the amount of money available for withholding. To verify the adequacy of the contractual safeguards, we reviewed portions of the MSE contract.

Our review was performed from June 1988 to March 1989 in accordance with generally accepted government auditing standards.

Major Contributors to This Report

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