

**Audit**



**Report**

OFFICE OF THE INSPECTOR GENERAL

**DEVELOPMENT AND ACQUISITION OF DOD MAINTENANCE  
AND DIAGNOSTIC SYSTEMS-ARMY**

Report No. 92-031

December 26, 1991

**Department of Defense**



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

December 26, 1991

**MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (FINANCIAL  
MANAGEMENT)**

**SUBJECT: Audit Report on the Development and Acquisition  
of DoD Maintenance and Diagnostic Systems-Army  
(Report No. 92-031)**


We are providing this final report for your information and use. It addresses matters concerning the acquisition and distribution of test equipment by the Army. Comments on a draft of this report were considered in preparing the final report.

DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. Therefore, the Assistant Secretary of the Army (Financial Management) must provide final comments on the unresolved recommendations and monetary benefits by February 26, 1992. See the "Status of Recommendations" section at the end of each finding for the unresolved recommendations and the specific requirements for your comments.

As required by DoD Directive 7650.3, the comments should indicate concurrence or nonconcurrence in the findings and each recommendation addressed to you. If you concur, describe the corrective actions taken, the estimated completion dates for actions already taken, and the estimated completion dates of planned actions. If you nonconcur, please state your specific reasons. If appropriate, you may propose alternative methods for accomplishing desired improvements.

If you nonconcur with the estimated monetary benefits or any part thereof, you must state the amount you nonconcur with and the basis for your nonconcurrence. Recommendations and potential monetary benefits are subject to resolution in accordance with DoD Directive 7650.3 in the event of nonconcurrence or failure to comment. We also ask that your comments indicate concurrence or nonconcurrence with the internal control weaknesses highlighted in Part I.

The courtesies extended to the audit staff are appreciated. If you have any questions on this audit, please contact Mr. Dennis Payne at (703) 614-6227 (DSN 224-6227) or Mr. Tilghman Schraden at (703) 693-0624 (DSN 223-0624). The distribution of this report is listed in Appendix F.



Edward R. Jones  
Deputy Assistant Inspector General  
for Auditing

Enclosures

cc:  
Secretary of the Army  
Assistant Secretary of Defense (Production and Logistics)

Office of the Inspector General, DoD

AUDIT REPORT No. 92-031  
(Project No. 0LB-0087.01)

December 26, 1991

DEVELOPMENT AND ACQUISITION OF DOD MAINTENANCE  
AND DIAGNOSTIC SYSTEMS-ARMY

EXECUTIVE SUMMARY

**Introduction.** The Integrated Family of Test Equipment Program was initiated by the Army in 1986 to reduce the proliferation of unique automatic test equipment that was being procured for each of the Army's weapon systems. Standard equipment developed under the Integrated Family of Test Equipment Program was designed to provide multi-functional testing capability of electronic components for major weapon systems. Over the 6-year Future Years Defense Program (FY 1992 through FY 1997) the Army planned, at the time of audit, to spend \$2.6 billion to transition to the new standard equipment. The Army advised us in responding to our draft report that the Army has revised the estimated 5-year expenditures for new standard equipment to \$600 million.

**Objectives.** Our audit objectives were to evaluate the compatibility, cost, performance, and other characteristics of various maintenance test and diagnostic systems being procured or scheduled for procurement. Special emphasis was placed on evaluating the transitioning to new equipment developed under the Army's Integrated Family of Test Equipment Program.

**Audit Results.** The Army was not effectively planning the acquisition and distribution of automatic test equipment.

o The Army planned to prematurely replace its simplified test equipment for the Abrams tank and Bradley fighting vehicle with new equipment developed under its Integrated Family of Test Equipment Program. Additionally, planned procurements of simplified test equipment exceeded requirements. As a result, the Army will not obtain full utility from existing test equipment and will incur unneeded interest cost to support premature procurements of the replacement equipment. Actions have been taken by the Army to reduce procurements of simplified test equipment (Finding A).

o The Army planned to prematurely replace electro-optical automatic test equipment for the Tube-launched Optically-tracked Wire-guided (TOW) missile with new equipment developed under its Integrated Family of Test Equipment Program. As a result, the Army will not obtain full utility from existing test equipment and will incur unneeded interest cost to support premature procurements of the replacement equipment (Finding B).

o The Army did not adequately justify the need for new electro-optical test equipment for the Abrams tank. As a result, there was no assurance that the equipment is needed (Finding C).

o Government contractors and Army maintenance depots did not fully use commercial equivalent automatic test equipment. As a result, requirements for commercial equivalents were overstated (Finding D).

**Internal Controls.** The audit revealed internal control weaknesses, which are described in Findings A, B, C, and D. Additional details are provided in the Internal Controls section in Part I of this report.

**Potential Benefits of Audit.** We estimated that savings of \$307.7 million are achievable over the 6-year Future Years Defense Program from implementing the report's recommendations (see Appendix D).

**Summary of Recommendations.** We recommended that the Army delay the replacement of automatic test equipment for the Abrams tank, Bradley fighting vehicle, and TOW missile; not procure electro-optical test equipment for the Abrams tank unless it can be economically justified; and cancel unneeded procurements of commercial equivalent test equipment. We also recommended that the Army improve its overall planning procedures for transitioning to new automatic test equipment under its Integrated Family of Test Equipment Program.

**Management Comments.** The Army disagreed with the recommendation to delay the replacement of automatic test equipment for the Abrams tank, Bradley fighting vehicle, and TOW missile based on an economic life expectancy for existing equipment of 7 years instead of 20 years; disagreed with the recommendation not to procure electro-optical test equipment for the Abrams tank unless it can be economically justified based on the absence of an electro-optical testing capability at the organizational level of maintenance; and partially agreed with the recommendation to cancel unneeded procurements of commercial equivalent test equipment. The Army also stated that its planning procedures were adequate.

**Audit Response.** We need to optimize the investment in existing test equipment and field new equipment only when it can be economically justified. We believe it was imprudent for the Army to change the life expectancy of existing test equipment from 20 years to 7 years (65 percent reduction) to justify the procurement of new equipment. We also believe it was imprudent, considering the absence of any significant documented maintenance deficiency, to proceed with plans to invest \$554 million for new electro-optical test equipment for the Abrams tank. We have requested that the Army reconsider its position in response to this final report.

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This report was prepared by the Logistics Support Directorate, Office of the Assistant Inspector General for Auditing, DoD. Copies of the report can be obtained from the Information Officer, Audit Planning and Technical Support Directorate, (703) 693-0340.

## PART I - INTRODUCTION

### Background

The Integrated Family of Test Equipment Program was initiated by the Army in 1986 to reduce the proliferation of unique automatic test equipment that was being procured for each of the Army's weapon systems. Equipment developed under the Integrated Family of Test Equipment Program was designated as the standard for the Army and was designed to provide multi-functional testing capability of electronic components for major weapon systems. Over the 6-year Future Years Defense Program (FY 1992 through FY 1997), the Army planned, at the time of audit, to spend \$2.6 billion to transition to the new standard equipment. The Army advised us in responding to our draft report that the Army has revised the estimated 5-year expenditures for new standard equipment to \$600 million.

### Objectives

Our audit objectives were to evaluate the compatibility, cost, performance, and other characteristics of various maintenance test and diagnostic systems being procured or scheduled for procurement. Special emphasis was placed on evaluating the transitioning to new equipment developed under the Army's Integrated Family of Test Equipment Program. We also evaluated applicable internal controls.

### Scope

Review of activities and program offices. At 15 Army activities that developed, procured, and utilized maintenance and diagnostic systems, we reviewed program documentation on file covering the period October 1983 through June 1991. We specifically examined requirements documents, cost analyses, fielding plans, procurement and contracting actions, accounting records, program budgets, and utilization and maintenance records for the Army's integrated family of test equipment. We also reviewed requirements documents for simplified test equipment for the Abrams tank and Bradley fighting vehicle.

Review of guidance. In addition, we reviewed the Army's guidance on automatic test equipment to determine if the policies and procedures for justifying and monitoring the development and acquisition of automatic test equipment were adequate.

Engineering assistance. Engineering specialists from the Office of the Inspector General, DoD, assisted the auditors in evaluating the compatibility and performance of simplified test equipment, contact test sets, and electro-optical test equipment for the Abrams tank and Bradley fighting vehicle. This was accomplished by analyzing requirements documents, system



specifications, test results, cost and operational effectiveness analyses, organizational and operational concepts, and other program documents.

Auditing standards. This economy and efficiency audit was made from September 1990 through June 1991 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly, included such tests of internal controls as were considered necessary. Activities visited or contacted during the audit are listed in Appendix E.

### Internal Controls

Controls assessed. We evaluated the internal controls associated with the implementation of guidance; adequacy of requirements, cost, operational effectiveness, and economic analyses; completeness and appropriateness of fielding plans; justification of procurement actions; and the effectiveness of procedures for monitoring the utilization of commercial equivalent automatic test equipment.

Internal control weaknesses. The audit identified material internal control weaknesses as defined by Public Law 97-255, Office of Management and Budget Circular A-123, and DoD Directive 5010.38. Controls were not effective to ensure that Army maintenance and diagnostic systems for its weapon systems were properly justified, acquired, and used as required by the Army regulations summarized in Appendix A. These internal control weaknesses are discussed in detail in Part II of this report. All recommendations in this report, if implemented, will assist in correcting these weaknesses. As detailed in Appendix D, we have estimated that monetary benefits of \$307.7 million over the 6-year Future Years Defense Program can be realized by implementing the recommendations. A copy of this report will be provided to the senior officials responsible for internal controls within the Army.

### Prior Audits and Other Reviews

The Army Audit Agency issued Report No. SO 90-213, "Maintenance and Calibration of Test, Measurement, and Diagnostic Equipment," on June 25, 1990, stating that improvements were needed in identifying equipment for calibration and in researching new calibration standards. The Army agreed to take corrective actions.

## PART II - FINDINGS AND RECOMMENDATIONS

### A. REPLACEMENT OF SIMPLIFIED TEST EQUIPMENT FOR THE ABRAMS TANK AND BRADLEY FIGHTING VEHICLE

The Army planned to prematurely replace its simplified test equipment for the Abrams tank and Bradley fighting vehicle with contact test sets developed under its Integrated Family of Test Equipment Program. Additionally, planned procurements of the simplified test equipment exceeded requirements. These conditions occurred primarily because internal control practices were not sufficient to ensure full compliance with Army planning regulations requirements to prepare adequate requirements, cost, operational effectiveness, and economic analyses to determine if planned acquisitions were cost-effective and economically justified. The Army could avoid losing \$58.4 million of utility from its current automatic test equipment over the 6-year Future Years Defense Program by delaying this equipment's replacement. Estimated interest costs of \$15.4 million, required to support the premature procurements over the 6-year Future Years Defense Program, could also be avoided. At the time of audit, the Army had already taken actions to stop \$10 million in excess procurements of simplified test equipment.

#### DISCUSSION OF DETAILS

##### Background

Simplified test equipment. The Army Tank-Automotive Command began fielding simplified test equipment for the Abrams tank and Bradley fighting vehicle in FY 1981. Fielding of this equipment is expected to be completed by FY 1994. The Army will then have about 4,700 pieces of simplified test equipment, valued at approximately \$99 million. This equipment has a useful life of 20 years.

Early replacement of simplified test equipment. Although the simplified test equipment will not begin to reach the end of its useful life until FY 2001, the Army plans to begin replacing the equipment in FY 1994 with contact test sets developed under its Integrated Family of Test Equipment Program.

Replacement costs and schedule. At the time of audit, the Army planned to expend about \$750 million to procure over 19,000 contact test sets for use on major Army weapon systems. Of the 19,000 contact test sets, 1,182, valued at \$70 million, were planned to replace the simplified test equipment for the Abrams tank and Bradley fighting vehicle. At the time of audit, the Army planned for delivery 43 percent of the replacement contact test sets in FY 1994. An additional 17 percent was planned for delivery in FY 1995. The planned delivery for the remaining 40 percent was not yet determined.

## Planning Process

Army planning regulations. The Army did not adequately plan for the acquisition and deployment of contact test sets for the Abrams tank and Bradley fighting vehicle. As detailed in Appendix A, Army Regulation 750-43, "Army Test, Measurement, and Diagnostic Equipment Program," dated October 27, 1989, states that new test equipment is to be introduced into the Army inventory only when supported with a valid requirement and when economically justified. Army Regulation 71-9, "Materiel Objectives and Requirements," dated February 20, 1987, further requires that a cost and operational effectiveness analysis be prepared to support decision milestones for acquisitions of automatic test equipment. The Army Program Manager for Test, Measurement, and Diagnostic Equipment was responsible for ensuring that a cost and operational effectiveness analysis was performed. Army Regulation 11-18, "The Cost and Economic Analysis Program," dated May 7, 1990, also requires that cost analyses and economic analyses be prepared comparing the costs and benefits of two or more alternatives. In summary, these regulations require all acquisitions of automatic test equipment to be supported by adequate requirements, cost, operational effectiveness, and economic analyses.

Analyses inadequate. The Army Program Manager for Test, Measurement, and Diagnostic Equipment stated that reliance was placed on two cost and operational effectiveness analyses performed under the sponsorship of the Army Training and Doctrine Command to support the decision to replace simplified test equipment for the Abrams tank and Bradley fighting vehicle with contact test sets. Although these analyses assessed the overall Integrated Family of Test Equipment Program, they did not specifically compare the contact test sets to the existing simplified test equipment. Neither of these analyses identified any deficiencies in the existing simplified test equipment. Additionally, they did not determine whether it would be cost-effective to replace the existing simplified test equipment with contact test sets.

Existing equipment is reliable and cost-effective. Analyses prepared for the Army Tank-Automotive Command that concluded that existing simplified test equipment was reliable and cost-effective were not considered by the Army Program Manager for Test, Measurement, and Diagnostic Equipment in making the decision to replace the simplified test equipment with contact test sets. These analyses included a test report prepared in August 1988 and a fielding assessment prepared in April 1990. These analyses concluded that there was no clear indication that contact test sets would provide better diagnostic capability than simplified test equipment. The fielding assessment concluded that organizational mechanics who used the simplified test equipment regularly, "were very satisfied with its performance."

Two cost analyses completed by the Army Tank-Automotive Command in January and April 1991 also were not considered in making the decision to replace simplified test equipment with contact test sets. These cost analyses showed no significant cost advantage in procuring the contact test sets over the existing automatic test equipment. The January 1991 analysis showed that the simplified test equipment was more cost-effective while the April 1991 analysis showed that contact test sets would save 4 percent of the cost of the simplified test equipment over 10 years. The April 1991 savings was based primarily on an estimated unit cost of less than \$48,000 for the contact test sets. At the time of audit, the estimate was that the unit costs would exceed \$59,000.

**Transitioning should be delayed.** Considering the reported reliability of the simplified test equipment, and the absence of any distinct economic cost advantage of the contact test sets, we believe that transitioning to the contact test sets for the Abrams tank and Bradley fighting vehicle should be delayed until the simplified test equipment nears the end of its useful life. Because of the requirements for contact test sets for other weapon systems, this delay should not result in any need to stop the production line for contact test sets and incur the cost of restarting production at a later date. As detailed in Appendix B, this delay would enable the Army to avoid losing \$58.4 million of utility from its simplified test equipment over the 6-year Future Years Defense Program. It would also provide an estimated savings of \$15.4 million in interest costs that would be required to support the premature procurement of contact test sets over the 6-year Future Years Defense Program for the Abrams tank and Bradley fighting vehicle. This savings estimate covers only the contact test sets that were already planned for delivery (at the time of audit) during the 6-year Future Years Defense Program (FY 1992 through FY 1997), which represents about 60 percent of the planned requirements.

**More pressing requirements for other weapon systems.** By delaying its transition to contact test sets for the Abrams tank and Bradley fighting vehicle, the Army will be in a better position to meet more pressing requirements for contact test sets for other weapon systems. For example, officials at the Army Aviation Systems Command cited requirements in FY 1992 for 300 contact test sets to support Apache helicopters. The Program Management Office for the Apache helicopter has procured a "trouble shooting maintenance aid" as an interim solution to its maintenance problems. By prioritizing the deployment of contact test sets for weapon systems such as the Apache helicopter, the Army could possibly reduce the need for and cost of such interim solutions.

## Procurements of Simplified Test Equipment

At the time of audit, the total quantity of simplified test equipment reported as on hand and as being procured exceeded requirements for this equipment. We brought this discrepancy to the attention of officials at the Program Executive Office for Armored Systems Modernization and the Army Tank-Automotive Command, in December 1990. We also issued a management letter to the Commander, Army Tank-Automotive Command, on January 18, 1991, confirming this discrepancy. In response to the reported discrepancies, on January 23, 1991, the Program Executive Officer for Armored Systems Modernization took positive management action by canceling unneeded procurement solicitations valued at \$10 million.

### RECOMMENDATIONS, MANAGEMENT COMMENTS, AND AUDIT RESPONSE

We recommend that the Army Program Manager for Test, Measurement, and Diagnostic Equipment:

1. Prepare adequate requirements, cost, operational effectiveness, and economic analyses for the contact test sets for the Abrams tank and the Bradley fighting vehicle, to determine if the acquisition is cost-effective and economically justified. If the acquisition is determined to be cost-effective and economically justified, a transition plan should be established that will optimize the investment in the existing simplified test equipment for the Abrams tank and the Bradley fighting vehicle by incrementally transitioning to contact test sets for these weapon systems near the end of the useful life of the simplified test equipment.

Army comments. Although the Assistant Secretary of the Army (Installations, Logistics and Environment) nonconcurred with the recommendation, he stated that a revision to the cost and operational effectiveness analysis for the overall Integrated Family of Test Equipment Program was in process and would address the contact test sets. The Assistant Secretary stated contact test sets have been viewed as a part of the overall maintenance support structure and have not been singled out for a one-on-one comparison with the simplified test equipment. The Assistant Secretary stated that although a comparison of proposed general purpose automatic test equipment (contact test sets) against a specific piece of fielded system specific equipment (simplified test equipment) will usually result in no cost advantage from transitioning to general purpose equipment, such one-on-one comparisons are contrary to Army Training and Doctrine Command policy. The Assistant Secretary stated that the performance of such one-on-one comparisons would block implementation of the Army's standard automatic test equipment policy and would foster the proliferation of system specific automatic test equipment. The Assistant Secretary further stated that simplified test equipment is not being used as it should be because it is bulky and unreliable. The Assistant Secretary stated that because of

these problems, the basic maintenance courses for the Abrams tank and Bradley fighting vehicle no longer included training on simplified test equipment. The Assistant Secretary stated that the transition plans for the contact test sets were still being developed and would be based on the priority needs of Army units.

The Assistant Secretary nonconcurrent with the estimated monetary benefits of \$73.8 million identified in Appendix D, stating that the Army is reducing its estimated economic life expectancy for existing simplified test equipment from 20 years to 7 years. The Assistant Secretary stated that this reduced estimated economic life expectancy eliminated all potential savings that might be obtained from further use of existing simplified test equipment. The Assistant Secretary stated that this reduced life expectancy is supported by the Office of Management and Budget, Department of Defense, and Department of the Army guidelines. The Assistant Secretary also stated that the cost of replacing the simplified test equipment with contact test sets would be approximately \$18 million (\$15,000 per unit) and not the \$70 million (\$59,000 per unit) cited in the draft report.

The Assistant Secretary took exception to the draft report's attribution of the sponsorship of the cost and operational effectiveness analyses performed for the overall Integrated Family of Test Equipment Program to the Army Program Manager for Test, Measurement, and Diagnostic Equipment, stating that the analyses were sponsored by the Army Training and Doctrine Command. The Assistant Secretary also stated that the current estimated 5-year program cost for the Integrated Family of Test Equipment Program was approximately \$600 million instead of the estimated \$2.6 billion 6-year program cost provided at the time of audit. The complete text of the Army's comments is in Part IV.

**Audit response.** We disagree with the Army's position that a decision on whether to replace existing system specific automatic test equipment with new general purpose automatic test equipment should not be based on an economic cost comparison between the existing equipment and the new equipment. Optimizing the investment in existing test equipment will not result in any additional proliferation of system specific automatic test equipment, it will only conserve funds that could be better used elsewhere. Proliferation of system specific automatic test equipment should be controlled by regulations that prohibit the development of new system specific equipment.

The Army's statement that the existing simplified test equipment needs to be replaced because it is not being used properly and it is unreliable is in conflict with assessments prepared by the Army Tank-Automotive Command. As stated in the report, these assessments concluded that organizational mechanics who used the simplified test equipment regularly "were very satisfied with its performance." These assessments also concluded that contact test sets would not provide better diagnostic capability than

simplified test equipment. Since 1981 the Army has invested more than \$100 million in this simplified test equipment and is continuing to field it. Analyses by its cognizant command state that it is reliable and cost-effective. This is inconsistent with the Army's response that this automatic test equipment is unreliable. Also, it does not seem appropriate that any difficulties in operating the equipment would be solved by terminating basic training on how to properly operate it.

The Army's decision to reduce the estimated economic life expectancy of simplified test equipment from 20 years to 7 years is in conflict with previous assessments performed by the Army. As cited in this report, the studies and analyses that the Army provided at the time of audit assumed a 20-year economic life expectancy for both the simplified test equipment and the contact test sets. Some simplified test equipment has been in use for 10 years. The regulations and examples cited to support the 7-year economic life expectancy refer to automatic data processing equipment and not automatic test equipment. The decision to reduce the estimated economic life expectancy is also in conflict with Office of Management and Budget Circular A-76, which identifies useful lives for electronic, computerized, and maintenance equipment ranging widely from 8 to 25 years. This includes 25 years for night vision equipment, 20 years for miscellaneous electrical and electronic components, and 20 years for repair shop specialized equipment. Current budget constraints dictate more than ever that actions be taken to maximize the use of existing equipment. The Army should determine if the economic life expectancy can be increased beyond 20 years, not reduced by 65 percent to 7 years.

The Army's estimated costs for procuring contact test sets have ranged widely from \$102,000 per unit to the estimate stated in the response of \$15,000 per unit. In June 1991, when the audit was completed, the Army's budget estimate was more than \$59,000 per unit. Two months earlier the Army's estimate was just under \$48,000 per unit. The December 1990 revised acquisition plan for the contact test sets established a design to unit production cost goal of \$102,000 per unit. The revised operational and organizational plan that was current as of April 1991 set the unit cost for contact test sets at from \$70,000 to \$80,000. These wide and rapidly changing estimates point out further the need to perform the recommended analyses before making a determination as to when and if the existing simplified test equipment should be replaced with contact test sets.

Concerning the \$15,000 per unit estimate, the Army has not responded to our August 1991 request to provide supporting data for this estimate. The Assistant Secretary's comments were unclear on whether the \$15,000 cited cost for the ruggedized version of the lightweight computer unit represents the full cost of a contact test set. The December 1990 revised acquisition plan for contact test sets provided for a contact test set consisting of two components - a Portable Maintenance Aid and an

Instrumentation-on-a-Card/Contact Test Set 3. It was also unclear whether the cited \$15,000 includes the cost of the test program sets (primarily software) required to adapt the contact test sets (hardware) to the unique electronic testing requirements of the Abrams tank and Bradley fighting vehicle. Historically, the cost of test program sets have been as great or greater than the cost of the supported hardware.

We have modified the final report to clarify that the cost and operational effectiveness analyses for the overall Integrated Family of Test Equipment Program was sponsored by the Army Training and Doctrine Command. We have also included in the final report the Army's estimate that the 5-year program cost for the Integrated Family of Test Equipment Program will be approximately \$600 million.

We request that the Army reconsider its position and provide further comments on the recommendation and estimated monetary benefits in its response to the final report.

2. Determine the savings that can be realized from providing earlier deployments of contact test sets to weapon systems, such as the Apache helicopter, that may have a priority need for new or replacement automatic test equipment. The Army's response to this report should enumerate any estimated savings identified.

Army comments. The Assistant Secretary of the Army (Installations, Logistics and Environment) concurred with the recommendation. The Assistant Secretary reported that he was unable to determine the estimated savings at this time. The Assistant Secretary also implied that expected price decreases for contact test sets might enable the Army to procure additional contact test sets.

Audit response. The Army's comments are responsive. However, we request that the Army provide comments detailing the estimated savings it expects to achieve by implementing this recommendation. If the Army is not in a position to determine the estimated savings in time to respond to this report, we request that the Army agree to report the actual monetary benefits it achieves to the Assistant Inspector General for Analysis and Followup. Procurements of contact test sets should be increased only if valid requirements exist, not because available funding will permit the purchase of additional sets. Therefore, we also request that the Army provide comments clarifying its position on procuring additional contact test sets because of expected price decreases.

3. In conjunction with the Army Tank-Automotive Command and other applicable commands, continue to review requirements for simplified test equipment for the Abrams tank and Bradley fighting vehicle and take actions to cancel any additional procurements that are determined to be unneeded.



Army comments. The Assistant Secretary of the Army (Installations, Logistics and Environment) concurred with the recommendation.

Audit response. The Army's comments are responsive. However, comments are requested concerning the potential monetary benefits of at least \$10 million identified in Appendix D.

4. Report and track the material weaknesses related to compliance with the planning requirements of Army Regulations 750-43 and 71-9, as required by DoD Directive 5010.38, "Internal Management Control Program."

Army comments. The Assistant Secretary of the Army (Installations, Logistics and Environment) nonconcurred with the recommendation based on the Army's decision to reduce the economic life expectancy of simplified test equipment from 20 years to 7 years.

Audit response. As stated in our response to the Assistant Secretary's comments to Recommendation A.1., we believe that the Army's action in reducing the economic life expectancy of simplified test equipment was inappropriate. As detailed in this report, there were several material weaknesses that led to inadequate planning for the acquisition and deployment of contact test sets and simplified test equipment. We request that the Army reconsider its position and provide further comments on the recommendation in its response to the final report.

STATUS OF RECOMMENDATIONS

<u>Number</u>	<u>Addressee</u>	<u>Response Should Cover:</u>			<u>Related Issues*</u>
		<u>Concur/Nonconcur</u>	<u>Proposed Action</u>	<u>Completion Date</u>	
1.	Army	X	X	X	M, IC
2.	Army		X	X	M, IC
3.	Army				M, IC
4.	Army	X	X	X	IC

\* M = monetary benefits; IC = material internal control weakness

## B. REPLACEMENT OF ELECTRO-OPTICAL AUTOMATIC TEST EQUIPMENT FOR THE BRADLEY FIGHTING VEHICLE

The Army planned to prematurely replace the portable electro-optical automatic test equipment for the Tube-launched Optically-tracked Wire-guided (TOW) missile on the Bradley fighting vehicle with an electro-optical augmentation of the contact test sets developed under its Integrated Family of Test Equipment Program. This condition occurred primarily because internal control practices did not ensure full compliance with Army planning regulations to prepare adequate requirements, cost, operational effectiveness, and economic analyses to determine if planned acquisitions were cost-effective and economically justified. The Army could avoid losing \$75.5 million of utility from its existing electro-optical test equipment over the 6-year Future Years Defense Program by delaying this equipment's replacement. Estimated interest costs of \$5.2 million required to support the premature procurements over the 6-year Future Years Defense Program could also be avoided.

### DISCUSSION OF DETAILS

#### Background

Existing equipment. The Army Missile Command began fielding portable electro-optical automatic test equipment for the TOW missile on the Bradley fighting vehicle in FY 1982. At the time of our audit, the Army planned to have 971 pieces of portable electro-optical test equipment by FY 1995, valued at approximately \$128 million. This included 210 pieces of this test equipment planned for procurement in FY 1991 and FY 1992, at a cost of \$40 million. This equipment has a useful life of 20 years.

Early replacement of existing equipment. Although the portable electro-optical test equipment will not begin to reach the end of its useful life until FY 2002, the Army plans to begin replacing the equipment in FY 1995 with an electro-optical augmentation to the contact test sets developed under its Integrated Family of Test Equipment Program. At the time of our audit, the electro-optical augmentation was entering full scale engineering development. Since the issuance of our draft report, we have been advised that the award of a limited production contract was delayed from August 1991 until early 1992 because the initial contractor cost proposals were too high. The total life cycle cost for the augmentation was estimated to be \$245 million for 127 contact test sets.

#### Planning Process

Army planning regulations. The Army did not adequately plan for the acquisition and deployment of the electro-optical augmentation of the contact test sets for the TOW Missile. As detailed in Appendix A, Army Regulation 750-43 states that new

test equipment is to be introduced into the Army inventory only when supported with a valid requirement and when economically justified. Army Regulation 71-9 requires that a cost and operational effectiveness analysis be prepared to support decision milestones for acquisitions of automatic test equipment. Army Regulation 11-18 requires that cost analyses and economic analyses be prepared comparing the costs and benefits of two or more alternatives. In summary, these regulations require all acquisitions of automatic test equipment to be supported by adequate requirements, cost, operational effectiveness, and economic analyses.

Analyses were inadequate. The Army did not adequately perform the required analyses to justify the acquisition of the electro-optical augmentation devices. The two analyses prepared in January 1989 and November 1990, by the Army Training and Doctrine Command, did not identify any deficiencies in the existing electro-optical test equipment for the TOW Missile or demonstrate the cost-effectiveness of replacing the existing equipment. The requirements document and the analyses performed did not demonstrate the need for electro-optical augmentation devices. The requirements document simply stated that an electro-optical capability was needed.

Users satisfied with existing equipment. Officials at the Army Missile Command stated that they were satisfied with the existing electro-optical test equipment for the TOW missile and would continue to procure this test equipment until the electro-optical augmentation devices for the contact test sets were officially required and available.

Transitioning should be delayed. Considering the stated satisfaction with the existing portable electro-optical test equipment, and the absence of a demonstrated economic advantage resulting from its early replacement, we believe that the transition to electro-optical augmentation devices for contact test sets should be delayed until the existing test equipment nears the end of its useful life. As detailed in Appendix C, this delay would enable the Army to avoid losing \$75.5 million of utility from its existing electro-optical test equipment for the TOW missile over the 6-year Future Years Defense Program. It would also provide an estimated savings of \$5.2 million in interest costs that would be required to support the premature procurement of electro-optical augmentation devices over the 6-year Future Years Defense Program. This savings estimate covers only the augmentation devices that were planned for delivery (at the time of audit) during the 6-year Future Years Defense Program (FY 1992 through FY 1997), which represents about 60 percent of the planned requirements.

## RECOMMENDATIONS, MANAGEMENT COMMENTS, AND AUDIT RESPONSE

We recommend that the Army Program Manager for Test, Measurement, and Diagnostic Equipment:

1. Prepare adequate requirements, cost, operational effectiveness, and economic analyses for the electro-optical augmentation of the contact test sets for the TOW missile, to determine if the acquisition of the augmentation is cost-effective and economically justified. If the acquisition is determined to be cost-effective and economically justified, a transition plan should be established that will optimize the investment in the existing portable electro-optical test equipment by incrementally transitioning to electro-optical augmentation devices near the end of the useful life of the portable electro-optical test equipment.

Army comments. The Assistant Secretary of the Army (Installations, Logistics and Environment) nonconcurred with the recommendation, stating that analyses have shown that general purpose electro-optical augmentation of contact test sets was less expensive than system specific augmentation. Therefore, no further analyses should be needed to demonstrate the economic justification for acquiring and fielding the electro-optical augmentation. The Assistant Secretary stated, however, that the transition plan for replacing the existing equipment was still being developed. The Assistant Secretary also stated that the new equipment would have greater capabilities than the existing test equipment.

The Assistant Secretary also nonconcurred with the estimated monetary benefits of \$80.7 million identified in Appendix D, stating that the Army's decision to reduce the economic life expectancy of existing equipment from 20 years to 7 years eliminated all savings that might be obtained from further use of existing equipment. The complete text of the Army's comments is in Part IV.

Audit response. The Army's analyses addressed only the cost-effectiveness of various alternatives for developing new electro-optical test equipment. They did not address the cost-effectiveness of replacing the existing portable electro-optical automatic test equipment. As stated in our response to Recommendation A.1., the Army's decision to justify the need for new equipment by reducing the economic life expectancy of existing equipment from 20 years to 7 years (65 percent) was inappropriate. The decision is in conflict with current budget constraints that dictate that actions need to be taken to maximize, not reduce, the use of existing equipment. Acquiring new equipment because it might have greater capability than existing equipment also needs to be fully assessed to determine if the benefits of obtaining this greater capability outweigh their costs. Any assessment would need to be supported by specific documented maintenance deficiencies with existing

equipment, and the specific cost savings and other benefits that would be obtained from prematurely replacing the existing equipment. We request that the Army reconsider its position and provide further comments on the recommendation and estimated monetary benefits in its response to the final report.

2. Report and track the material weaknesses related to compliance with the planning requirements of Army Regulations 750-43 and 71-9, as required by DoD Directive 5010.38, "Internal Management Control Program."

Army comments. The Assistant Secretary of the Army (Installations, Logistics and Environment) nonconcurred with the recommendation based on the Army's decision to reduce the economic life expectancy of portable electro-optical automatic test equipment from 20 years to 7 years.

Audit response. As stated in our response to the Army's comments to Recommendation B.1., we believe that the Army's action in reducing the economic life expectancy of portable electro-optical automatic test equipment was inappropriate. As detailed in this report, there were several material weaknesses that led to inadequate planning for the acquisition and deployment of electro-optical augmentation of contact test sets. We request that the Army reconsider its position and provide further comments on the recommendation in its response to the final report.

STATUS OF RECOMMENDATIONS

<u>Number</u>	<u>Addressee</u>	<u>Response Should Cover:</u>			<u>Related Issues*</u>
		<u>Concur/ Nonconcur</u>	<u>Proposed Action</u>	<u>Completion Date</u>	
1.	Army	X	X	X	M, IC
2.	Army	X	X	X	IC

\* M = monetary benefits; IC = material internal control weakness

### C. REQUIREMENTS FOR ELECTRO-OPTICAL AUTOMATIC TEST EQUIPMENT FOR THE ABRAMS TANK

The Army did not adequately justify the need for new electro-optical automatic test equipment for the Abrams tank. This condition occurred primarily because internal control practices did not ensure full compliance with Army planning regulations to prepare adequate requirements, cost, operational effectiveness, and economic analyses to determine if planned acquisitions were cost-effective and economically justified. As a result, there was no assurance that planned procurements of 219 electro-optical augmentation automatic test equipment devices, costing \$137.8 million, over the 6-year Future Years Defense Program, are necessary.

#### DISCUSSION OF DETAILS

##### Background

The Army Program Manager for Test, Measurement, and Diagnostic Equipment has in full-scale engineering development an electro-optical augmentation automatic test equipment device for the contact test sets to test and diagnose electro-optical subsystems in the Abrams tank. The existing simplified test equipment used for the Abrams tank has some capability for testing and diagnosing electro-optical subsystems. The Army planned to procure, at the time of our audit, 219 electro-optical augmentation devices in FYs 1995 and 1996. The life cycle costs for this new equipment through FY 1997 (the period of the 6-year Future Years Defense Program) totaled \$137.8 million. The Army planned to eventually field 355 augmentation devices with an estimated total life cycle cost of \$685 million.

In responding to our draft report, the Army advised us that its funded program for FY 1994 through FY 1997 would provide for the procurement of only 77 augmentation devices at an estimated cost of \$15.4 million. This estimate does not include full life cycle costs including sustainment costs and interest costs required to support the procurement. The Army's response also advised that the estimated total requirements were reduced to 287 augmentation devices. This reduction in the number of augmentation devices from 355 to 287 reduced the estimated life cycle cost by \$131 million from \$685 million to \$554 million.

##### Requirements Analysis

Army planning regulations. The planned procurements of electro-optical augmentation devices were not adequately justified. As detailed in Appendix A, Army Regulation 750-43 states that new test equipment is to be introduced into the Army inventory only when supported with a valid requirement and when economically justified. Army Regulation 71-9 requires that a cost and operational effectiveness analysis be prepared to support decision milestones for acquisitions of automatic test

equipment. Army Regulation 11-18 requires that cost analyses and economic analyses be prepared comparing the costs and benefits of two or more alternatives. In summary, these regulations require all acquisitions of automatic test equipment to be supported by adequate requirements, cost, operational effectiveness, and economic analyses.

**Analyses were not adequate.** The Army Training and Doctrine Command prepared two analyses for the Army Program Manager for Test, Measurement, and Diagnostic Equipment. The analyses did not include adequate evaluations of any existing deficiencies in the present simplified test equipment or assess other alternatives for testing the electro-optical capability of the Abrams tank.

**Justification for new equipment.** The primary justification provided by the staff of the Army Program Manager for Test, Measurement, and Diagnostic Equipment for developing the electro-optical augmentation devices was to reduce the "no evidence of failure rate" (test results indicate no component or equipment failure) experienced when testing electro-optical systems removed from the turrets of the Abrams tank. The Program Manager stated that for 45 percent of the instances in which the simplified test equipment indicated that there were electro-optical problems on the gunner primary sight in the turret of the Abrams tank, no problems (no evidence of failure) were found after the gunner primary sights were removed and taken to intermediate or depot level maintenance activities for further testing. The Program Manager estimated that the cost to remove, transfer, and reinstall the gunner primary sight from the turret averaged \$156,000.

**No documentation supporting justification.** The scope and rate of the "no evidence of failure" problem was not documented. Neither the Program Manager for Test, Measurement, and Diagnostic Equipment nor the logistics and maintenance personnel at several Army activities could provide any maintenance records or analyses on the actual number of gunner primary sights being unnecessarily dismantled based on erroneous determinations that electro-optical problems might exist. Without such information, it was impossible to assess whether a significant problem, that would necessitate an investment of \$554 million, existed.

**Similar problems resolved through low cost software changes.** When similar problems occurred with the simplified test equipment for the Bradley fighting vehicle, a post-fielding survey performed by the Army Tank-Automotive Command showed that a difference in the testing parameters used at the intermediate and field maintenance levels caused the no evidence of failure problem. This problem was resolved by a software change that made the test parameters the same for both the field level and

intermediate level test equipment. A determination needs to be made as to whether a similar difference in testing parameters accounts for any "no evidence of failure" problems on the Abrams tank.

**Requirements overstated.** Even if the Army determines that a significant problem exists and the electro-optical augmentation devices are the most cost-effective method of addressing that problem, the number of augmentation devices the Army planned to procure was substantially overstated. During our audit, the Army planned to procure 355 augmentation devices. One for each contact test set required by maintenance support teams that provide direct support to the Abrams tank plus 72 augmentation devices for training purposes. This included augmentation devices for 99 area support teams (a specific type of maintenance support team that provides direct support). However, only 33 area support teams to be allocated contact test sets will provide electro-optical maintenance for the turret in the Abrams tank. The Army advised us in responding to the draft report that it has eliminated requirements for augmentation devices for the 66 area support teams that will not provide electro-optical maintenance. The planned requirements also did not give consideration to the fact that only 10 percent of the maintenance calls for these support teams involved an electro-optical problem. If an economically valid need for electro-optical augmentation devices is demonstrated, then an assessment needs to be made as to the minimum quantity required to meet that need.

### **Conclusion**

We believe that the Army should delay making any decision to acquire electro-optical augmentation automatic test equipment for the Abrams tank until adequate requirements, cost, operational effectiveness, and economic analyses are performed. To proceed at this time could result in acquisitions of unneeded augmentation devices costing \$554 million over their life cycle.

### **RECOMMENDATIONS, MANAGEMENT COMMENTS, AND AUDIT RESPONSE**

**We recommend that the Army Program Manager for Test, Measurement, and Diagnostic Equipment:**

1. Delay making any decision to acquire electro-optical augmentation test equipment for the Abrams tank until adequate requirements, cost, operational effectiveness, and economic analyses are performed to determine if the acquisition would be cost-effective and economically justified. These analyses should include an evaluation of the no evidence of failure rate reported by Army units for maintenance of electro-optical systems in the Abrams tank to determine the rate's effect on the requirement for electro-optical augmentation. If significant problems are found,



the analyses should fully assess alternative solutions for correcting the problems, and choose the most cost-effective method for implementation.

Army comments. Although the Assistant Secretary of the Army (Installations, Logistics and Environment) nonconcurred with the recommendation and the estimated monetary benefits, he stated that before making a production decision in FY 1993, the Army would analyze the electro-optical augmentation test equipment to address its cost-effectiveness and quantity requirements. The Assistant Secretary also stated that previous analysis had shown that electro-optical augmentation of the contact test sets was more cost-effective than a system specific augmentation. Further, the Assistant Secretary stated that no analyses were needed to demonstrate the economic justification for acquiring and fielding the electro-optical augmentation because no equipment existed at the organizational or direct support level for electro-optical analysis. The simplified test equipment does not have any electro-optical capability.

The Assistant Secretary stated that attempts to obtain specific and credible data on the "no evidence of failure rate" had been unsuccessful. The Assistant Secretary also stated that the justification for the equipment was not driven primarily by the "no evidence of failure rate" history, but rather from the absence of the electro-optical testing capability at the organizational level of maintenance.

Although a final production decision will not be made until FY 1993, the Assistant Secretary stated that the Army's long-range plans were to procure 287 systems. The Assistant Secretary also stated that the historical knowledge that only 10 percent of maintenance calls have involved electro-optical problems cannot be considered in determining requirements because at the time a maintenance call is received the cause of the failure is not normally known. Therefore, the Assistant Secretary stated that each maintenance team must have identical equipment. The Assistant Secretary stated further that the Army plans to procure only 77 systems valued at \$15.4 million through FY 1997, instead of the 219 systems valued at \$137.8 million cited in this report. The complete text of the Army's comments is in Part IV.

Audit response. Although the Assistant Secretary nonconcurred with the recommendation, we agree with the Army's plan to analyze the cost-effectiveness and quantity requirements for the electro-optical augmentation test equipment before making a production decision in FY 1993.

We are concerned with the Army's position that although no significant documented maintenance deficiency exists, the Army plans to make an investment of \$554 million in new test equipment. The only significant deficiency the Army has provided in support of its intention to develop and acquire this new test

equipment has been the "no evidence of failure rate." The Army states in its comments that attempts to obtain specific and credible data on the "no evidence of failure rate" have been unsuccessful. The Army also stated in its December 1990 Integrated Family of Test Equipment Electro-Optical Program Cost-Benefit Analysis that estimates of requirements for the electro-optical augmentation "are characterized with much uncertainty . . . Force reductions together with force restructuring and associated doctrinal changes all add to the fog of requirements." In addition, at a December 1990 proof-of-principle demonstration of the electro-optical augmentation device, organizational level maintenance personnel questioned the device's utility or its added capability to existing test methods. Without a demonstratable need for this new equipment, we continue to believe that a final decision to acquire electro-optical automatic test equipment should be made only if supported by positive results from comprehensive requirements, cost, operational effectiveness, and economic analyses.

We disagree with the Assistant Secretary's statement that the existing simplified test equipment has no electro-optical testing capability. The simplified test equipment is capable of performing a number of electro-optical tests including functional performance testing of the Abrams tank gunners primary sight and thermal imaging systems. This includes the capability to test the elevation and azimuth mirror gyro feedback response and thermal range display and response. While germane, the most important question that needs to be answered is not the electro-optical testing capability of existing equipment, but whether there is an economically valid need for new equipment to obtain additional capabilities.

With respect to the Army's comments concerning its planned procurements, the Army's long-range plans to reduce the number of systems from 355 to 287 (which represents a reduction in the estimated life cycle costs of the equipment from \$685 million to \$554 million, a savings of \$131 million [\$34.9 million over the 6-year Future Years Defense Program]) while significant, is not as important as determining first if any economically justifiable reason exists to procure any equipment. If the recommended analyses demonstrate that there is an economically valid need for the new test equipment, then an assessment needs to be made as to the minimum quantity required to meet that need.

We do not understand the Army's position that the historical knowledge that only 10 percent of maintenance calls have involved electro-optical problems should not be considered in determining requirements, because at the time a maintenance call is received, the cause of the failure is not normally known. We believe that in most cases the responsible official making the maintenance call will have sufficient knowledge to know whether a potential electro-optical problem exists. This knowledge should reduce the number of systems that might be required.

With respect to the Army's comments concerning our statement that the Army planned to procure 219 systems valued at \$137.8 million through FY 1997, the number represented the Army's planned production schedule at the time of audit. The estimated \$137.8 million included not only procurement costs but also sustainment costs and interest costs required to support the procurement. We have included in the final report the Assistant Secretary's statement that the Army's funded program for FY 1994 through FY 1997 would provide for the procurement of only 77 augmentation devices at an estimated cost of \$15.4 million. This estimate does not include sustainment costs and the interest costs required to support the procurement.

We request that the Army clarify its position regarding the recommendation and estimated monetary benefits in its response to the final report.

2. Report and track the material weaknesses related to compliance with the planning requirements of Army Regulations 750-43 and 71-9, as required by DoD Directive 5010.38, "Internal Management Control Program."

Army comments. The Assistant Secretary of the Army (Installations, Logistics and Environment) nonconcurred stating that the cited internal control weaknesses did not exist.

Audit response. As detailed in this report and as stated in our response to the Army's comments to Recommendation C.1., there were several material weaknesses that led to inadequate planning for the development and acquisition of electro-optical augmentation test equipment. We request that the Army reconsider its position and provide further comments on the recommendation in its response to the final report.

#### STATUS OF RECOMMENDATIONS

<u>Number</u>	<u>Addressee</u>	<u>Response Should Cover:</u>			<u>Related Issues*</u>
		<u>Concur/ Nonconcur</u>	<u>Proposed Action</u>	<u>Completion Date</u>	
1.	Army	X	X	X	M, IC
2.	Army	X	X	X	IC

\* M = monetary benefits; IC = material internal control weakness

#### D. REQUIREMENTS FOR COMMERCIAL EQUIVALENT AUTOMATIC TEST EQUIPMENT

Government contractors and Army maintenance depots did not fully use the commercial equivalent automatic test equipment that was on hand. The Army Program Manager for Test, Measurement, and Diagnostic Equipment did not implement effective procedures for monitoring the utilization and distribution of commercial equivalent automatic test equipment. As a result, requirements for procurements of additional commercial equivalent automatic test equipment were overstated by at least \$5.4 million.

#### DISCUSSION OF DETAILS

##### Background

Commercial equivalent equipment. Commercial equivalent automatic test equipment (commercial equivalents) was developed under the Army's Integrated Family of Test Equipment Program. Government contractors and Army depot level maintenance activities use commercial equivalents for developing test program sets for supported weapon systems, and for testing and diagnosing faults in electronic equipment. Test program sets are a combination of computer hardware and software packages that enable electronic systems under test to interface with the diagnostic system doing the testing. As of April 1991, the Army had procured 34 of these commercial equivalents at a cost of \$58.6 million. The Army planned to buy 41 additional commercial equivalents at an estimated cost of \$68.7 million, through FY 1997.

Army planning regulation. As detailed in Appendix A, Army Regulation 750-43 requires managers of automatic test equipment to identify any underutilized automatic test equipment to the Army Program Manager for Test, Measurement, and Diagnostic Equipment, for evaluation. The Deputy Executive Director for Test, Measurement, and Diagnostic Equipment is responsible for ensuring that procedures are developed and implemented to optimize the use of automatic test equipment and to reduce the inventory at all levels of maintenance. The regulation further requires Army commanders to use automatic test equipment pools at installations, when feasible, to get the best use of automatic test equipment assets and to control use of high-demand and low density automatic test equipment. The regulation also requires the Army Deputy Executive Director for Test, Measurement, and Diagnostic Equipment to negotiate the disposition and redistribution of underutilized automatic test equipment with the commanders of the major Army commands.

##### Monitoring Commercial Equivalent Equipment Utilization

Lack of effective internal controls. The Army Program Manager for Test, Measurement, and Diagnostic Equipment was not effectively monitoring the utilization of commercial equivalents

located at Government contractors' facilities and Army maintenance depots. As the system developer for the Integrated Family of Test Equipment, the Program Manager was the focal point in the Army for procuring and distributing the commercial equivalents. Therefore, the Program Manager was in the unique position of having access to data from organizations requesting and using the commercial equivalents. Because of his accessibility, the Program Manager should have been monitoring the utilization of the commercial equivalents in accordance with Army Regulation 750-43, to determine potential underutilization and redistribution of commercial equivalents. However, the Program Manager did not have an effective system of controls to collect and evaluate utilization data on the commercial equivalents.

When we requested that the Program Manager for Test, Measurement, and Diagnostic Equipment provide us the utilization statistics for the commercial equivalents in use at the time of our audit, the Program Manager provided insufficient data to determine if the commercial equivalents were efficiently utilized. Instead, the Program Manager relied on activities that held the commercial equivalents to notify him if the equipment was not needed, as required by Army Regulation 750-43. The Program Manager stated that data on the utilization of commercial equivalents could be obtained by requesting the data from the holders of the commercial equivalents. Because the Program Manager relied primarily on voluntary notifications from activities that commercial equivalents were not needed, the Program Manager was generally unaware of commercial equivalents that were underutilized.

Equipment not fully utilized. We reviewed the utilization of 11 of the 34 commercial equivalents that the Army had procured as of April 1991 and determined that 3 were not being fully utilized by Government contractors and Army maintenance depots. This included one provided to the Anniston Army Depot and two provided to Mantech Corporation.

**Anniston Army Depot.** At the Anniston Army Depot, a commercial equivalent was purchased by the Army Missile Command in July 1989 to validate test program sets for the Tube-launched Optically-tracked Wire-guided (TOW) missile on the Cobra helicopter. However, the decision to develop test program sets for the TOW missile had not been finalized at the time that a decision was made to purchase the commercial equivalent. Subsequently, the Army Missile Command decided not to fund the development of the test program sets. As a result, the commercial equivalent at the Anniston Army Depot has not been used for the intended purpose of developing test program sets since its delivery in 1989. This commercial equivalent, valued at approximately \$1.8 million, was available and could be provided to another Army maintenance depot or Government contractor, reducing future Army requirements for a commercial equivalent.

**Mantech Corporation.** Three commercial equivalents were furnished to Mantech Corporation in 1989 to be used to develop 11 test program sets for the Joint Tactical Fusion Program's All Sources Analysis System. However, after delivery of the equipment was completed, the requirement was changed from 11 test program sets to only 3 program sets, thus reducing the work load and the total quantity of commercial equivalents that were needed. We estimated that this work load could have been accomplished with just one of the three commercial equivalents. In March 1991, during our audit, the Army Program Manager for Test, Measurement, and Diagnostic Equipment redistributed one unneeded commercial equivalent, valued at approximately \$1.8 million, to another Army maintenance activity. The Army also indicated that after the completion of the development of the test program sets in July 1991, it planned as a result of our inquiries to redistribute the remaining two commercial equivalents to the Army Depot Systems Command.

### Conclusion

The overall requirement for the commercial equivalents could be reduced if the Program Manager for Test, Measurement, and Diagnostic Equipment develops a system to monitor the utilization of commercial equivalents. With the monitoring system, the Program Manager could determine if the equipment is fully utilized, and if not fully utilized, determine if any of the commercial equivalents can be redistributed to other Government contractors or Army maintenance depots. We also believe the Program Manager needs to do more thorough analyses on the deployment of commercial equivalents to ensure that the date a commercial equivalent is fielded is coordinated with the date the work load for that commercial equivalent is available, to avoid underutilization of the equipment. By actively monitoring the utilization of commercial equivalents, the Program Manager could reduce the need for additional procurements of the commercial equivalents by the Army.

### RECOMMENDATIONS, MANAGEMENT COMMENTS, AND AUDIT RESPONSE

**We recommend that the Army Program Manager for Test, Measurement, and Diagnostic Equipment:**

1. Determine the commercial equivalent equipment that is underutilized by requesting and evaluating utilization records provided by Army maintenance depots and Government contractors, and in conjunction with the Deputy Executive Director for Test, Measurement, and Diagnostic Equipment, ensure that actions are taken to redistribute the underutilized equipment to other Army maintenance depots and Government contractors requiring such equipment.

Army comments. The Assistant Secretary of the Army (Installations, Logistics, and Environment) stated that the Army Program Manager for Test, Measurement, and Diagnostic Equipment would put into place a mechanism for collecting and evaluating utilization statistics and recommend redistribution of the commercial equivalents. The Assistant Secretary nonconcurred with the portion of draft report Recommendation D.1. that the Program Manager redistribute the underutilized equipment to other Army maintenance depots and Government contractors requiring such equipment by stating that the Program Manager could only recommend redistribution of equipment to the Deputy Executive Director for Test, Measurement, and Diagnostic Equipment. The Assistant Secretary stated that the Deputy Executive Director has only the authority to negotiate the redistribution of equipment with the affected major Army commands and could not unilaterally initiate a redistribution of equipment.

The Assistant Secretary stated that the total monetary benefits from implementing this recommendation would be only \$1.8 million instead of the \$5.4 million stated in this report. The \$1.8 million represents the procurement savings from redistributing the commercial equivalent at the Anniston Army Depot. The difference is based on the Army's decision to redistribute the two commercial equivalents being used at Mantech Corporation (to develop test program sets for the All Source Analysis System) to an Army depot to be used in support of the All Source Analysis System. The Army stated that as a result of this decision, the estimated \$3.6 million in savings will not be realized. The Assistant Secretary also stated that the cited commercial equivalent at the Anniston Army Depot was used to train depot personnel and familiarize them with the equipment. The complete text of the Army's comments is in Part IV.

Audit response. The mechanism the Army is developing for collecting and evaluating utilization statistics should satisfy the intent of the first part of this recommendation. However, we request that the Army's response to the final report include the estimated date for completing this action.

In response to the Army's comments on the second part of the draft report Recommendation D.1., we have revised the recommendation to clarify that the Program Manager for Test, Measurement, and Diagnostic Equipment needs to act in conjunction with the Deputy Executive Director for Test, Measurement, and Diagnostic Equipment to ensure that actions are taken to redistribute underutilized equipment to other Army maintenance depots and Government contractors requiring such equipment. We recognize that the Deputy Executive Director does not have unilateral authority to order redistributions, but must rely on negotiations with the affected Army commands. When the negotiations are unsuccessful, we would expect that the Deputy Executive Director would elevate the matter to officials who do

have the authority to take unilateral actions. We request that the Army reconsider its position and provide full concurrence with the recommendation in its response to the final report.

The estimated monetary benefits of at least \$5.4 million, summarized in Appendix D, included the commercial equivalent provided to the Anniston Army Depot, the commercial equivalent redistributed from Mantech Corporation in March 1991 after we provided notification of its underutilization to Army officials in December 1990, and one of the two remaining commercial equivalents provided to Mantech Corporation. The Assistant Secretary concurred with the estimated \$1.8 million in savings achieved by redistributing the commercial equivalent at the Anniston Army Depot, but did not comment on the \$1.8 million in savings achieved when an underutilized commercial equivalent was redistributed from Mantech Corporation in March 1991. As stated in this report, we believe that the work load at Mantech Corporation justified the need for only one of the two remaining commercial equivalents. Information on the specific activities where the Army planned to locate the additional 41 commercial equivalents planned for procurement through FY 1987 has not been provided. However, if these 41 commercial equivalents included the two commercial equivalents that the Army plans to relocate from Mantech Corporation to an Army depot to satisfy requirements for support of the All Source Analysis System, the cost savings will increase from \$5.4 million to \$7.2 million. We are pleased that the Anniston Army Depot, when the planned work load did not materialize, was able to achieve some utility from its commercial equivalent by using it for training purposes. We request that the Army reconsider its position and provide further comments on the estimated monetary benefits in its response to the final report. We also request that the Army identify any additional savings it expects to achieve from collecting and evaluating utilization statistics of commercial equivalents.

**2. Evaluate overall requirements for commercial equivalent equipment and reduce or cancel unneeded planned procurements.**

**Army comments.** The Assistant Secretary of the Army (Installations, Logistics and Environment) concurred with the recommendation.

**Audit response.** The Army's comments are responsive. However, we request that the Army's response to the final report include the estimated date for completing this action. We also request that the Army provide comments detailing the estimated savings it expects to achieve by implementing this recommendation. If the Army is not in a position to determine the estimated savings in time to respond to this report, we request that the Army agree to report the actual monetary benefits it achieves to the Assistant Inspector General for Analysis and Followup.



3. Report and track the material weaknesses related to compliance with the monitoring and planning requirements of Army Regulation 750-43, as required by DoD Directive 5010.38, "Internal Management Control Program."

Army comments. The Assistant Secretary of the Army (Installations, Logistics and Environment) nonconcurred with the recommendation stating that Army Regulation 750-43 does not require the Army Program Manager for Test, Measurement, and Diagnostic Equipment to monitor utilization of automatic test equipment.

Audit response. As detailed in this report, there were several material weaknesses in the Army's monitoring of commercial equivalent equipment. Army Regulation 750-43 requires that there be an adequate system of internal controls to effectively monitor and optimize the utilization of automatic test equipment. We request that the Army reconsider its position and provide further comments on the recommendation in its response to the final report.

STATUS OF RECOMMENDATIONS

<u>Number</u>	<u>Addressee</u>	<u>Response Should Cover:</u>			<u>Related Issues*</u>
		<u>Concur/ Nonconcur</u>	<u>Proposed Action</u>	<u>Completion Date</u>	
1.	Army	X	X	X	M, IC
2.	Army			X	M, IC
3.	Army	X	X	X	IC

\* M = monetary benefits; IC = material internal control weakness

PART III - ADDITIONAL INFORMATION

- APPENDIX A - Compendium of Applicable Army Regulations
- APPENDIX B - Computations of Savings from Deferring Procurements of Contact Test Sets for the Abrams Tank and Bradley Fighting Vehicle
- APPENDIX C - Computations of Savings from Deferring Procurements of the Electro-Optical Augmentation of Contact Test Sets for the TOW Missile on the Bradley Fighting Vehicle
- APPENDIX D - Summary of Potential Monetary and Other Benefits Resulting from Audit
- APPENDIX E - Activities Visited or Contacted
- APPENDIX F - Report Distribution



## APPENDIX A: COMPENDIUM OF APPLICABLE ARMY REGULATIONS

Army Regulation 750-43, "Army Test, Measurement, and Diagnostic Equipment Program," dated October 27, 1989. The Regulation prescribes policies and procedures for managing test, measurement, and diagnostic equipment. It requires that procedures optimize the capability of test, measurement, and diagnostic equipment and reduce the inventory of this type of equipment. The Regulation states that new items will be introduced into the Army inventory only when supported with a valid requirement and economically justified. It also requires system developers to determine their automatic test equipment requirements, in coordination with the Program Manager for Test, Measurement, and Diagnostic Equipment and the Army Training and Doctrine Command. Further, it requires that a system repair level analysis be prepared to identify as well as to justify automatic test equipment requirements at the various levels of maintenance. The analysis is required to address test, measurement, and diagnostic equipment requirements and alternatives; the system test envelope; workload distribution; and estimated failure frequency.

Army Regulation 71-9, "Materiel Objectives and Requirements," dated February 20, 1987. The Regulation requires that a cost and operational effectiveness analysis be prepared to support decision milestones regarding materiel acquisitions. The analysis should be a comparative evaluation of competing alternatives of systems and programs. The analysis should identify the relative effectiveness and associated costs of each alternative so that decisionmakers can select the best action to meet an identified need.

Army Regulation 700-142, "Materiel Release, Fielding, and Transfer," dated April 27, 1988. The Regulation requires the commanders of materiel development commands to plan, coordinate, and implement the materiel systems (includes automatic test equipment) release, fielding, and transfer processes. These processes include the development and coordination of materiel fielding plans and materiel transfer plans. The materiel fielding plan should include the latest deployment schedules by unit, location, date, and quantity of the materiel system. A materiel transfer plan must include the identity of displaced materiel systems and end items (including test, measurement, and diagnostic equipment) that become excess.

Army Regulation 11-18, "The Cost and Economic Analysis Program," dated May 7, 1990. The Regulation provides policy for the preparation of cost analyses and economic analyses. The analysis should produce a comparison of costs and benefits of two or more alternatives or a comparison of actual performance with the originally approved program.

APPENDIX A: COMPENDIUM OF APPLICABLE ARMY REGULATIONS (cont'd)

Army Regulation 70-1, "System Acquisition Policy and Procedures,"  
dated October 10, 1988. The Regulation requires that an  
affordability assessment be considered at every decision  
milestone of a weapon system acquisition.

**APPENDIX B: COMPUTATIONS OF SAVINGS FROM DEFERRING PROCUREMENTS OF CONTACT TEST SETS FOR THE ABRAMS TANK AND BRADLEY FIGHTING VEHICLE**

**A. INCREASED UTILITY OF CURRENT TEST EQUIPMENT**

	<u>FY 1994</u>	<u>FY 1995</u>	<u>Total</u>
Undepreciated Value of Current Simplified Test Equipment <u>1/</u>	\$99,458,000	\$91,965,000	
Percent of Replacement Contact Test Sets Planned for Delivery	<u>x 0.43</u>	<u>x 0.17</u>	
Lost Utility from Premature Replacement of Test Equipment	<u>\$42,767,000</u>	<u>\$15,634,000</u>	<u>\$58,401,000</u>

**B. AVOIDANCE OF INTEREST COSTS FROM DELAYING PROCUREMENTS OF REPLACEMENT EQUIPMENT**

<u>FY</u>	<u>Interest Costs Required to Support Procurements <u>2/</u></u>		<u>Total</u>
	<u>Procurements Planned for FY 1994</u>	<u>Procurements Planned for FY 1995</u>	
1994	\$ 2,677,000	\$ -0-	\$ 2,677,000
1995	2,891,000	1,040,000	3,931,000
1996	3,122,000	1,124,000	4,246,000
1997	3,372,000	1,213,000	<u>4,585,000</u>
			<u>\$15,439,000</u>

1/ Represents cost of simplified test equipment fielded from FY 1981 through FY 1994, less depreciation, using the straight-line method over the equipment's expected 20-year life.

2/ Computed using the 8-percent Department of Treasury interest rate published in Bulletin Number 91-02, Financial Management Service.



**APPENDIX C: COMPUTATIONS OF SAVINGS FROM DEFERRING PROCUREMENTS  
OF THE ELECTRO-OPTICAL AUGMENTATION OF CONTACT TEST SETS FOR THE  
TOW MISSILE ON THE BRADLEY FIGHTING VEHICLE**

**A. INCREASED UTILITY OF CURRENT TEST EQUIPMENT**

	<u>FY 1995</u>	<u>FY 1996</u>	<u>Total</u>
Undepreciated Value of Current TOW Electro-Optical Test Equipment <u>1/</u>	\$127,687,000	\$117,926,000	
Percent of Replacement Electro-Optical Augmentation Test Sets Planned for Delivery	<u>x 0.37</u>	<u>x 0.24</u>	
Lost Utility from Premature Replacement of Test Equipment	<u>\$ 47,244,000</u>	<u>\$ 28,302,000</u>	<u>\$75,546,000</u>

**B. AVOIDANCE OF INTEREST COSTS FROM DEFERRING PROCUREMENTS OF  
REPLACEMENT EQUIPMENT**

<u>FY</u>	<u>Interest Costs Required to Support Procurements <sup>2/</sup></u>		<u>Total</u>
	<u>Procurements Planned for FY 1995</u>	<u>Procurements Planned for FY 1996</u>	
1995	\$ 1,128,000	\$ -0-	\$ 1,128,000
1996	1,218,000	720,000	1,938,000
1997	1,316,000	778,000	<u>2,094,000</u>
			<u>\$ 5,160,000</u>

1/ Represents costs of TOW electro-optical test equipment fielded from FY 1982 through FY 1995, less depreciation, using the straight-line method over the equipment's expected 20-year life.

2/ Computed using the 8-percent Department of Treasury interest rate published in Bulletin Number 91-02, Financial Management Service.





**APPENDIX D: SUMMARY OF POTENTIAL MONETARY AND OTHER BENEFITS  
RESULTING FROM AUDIT**

<u>Recommendation Reference</u>	<u>Description of Benefit</u>	<u>Amount and or Type of Benefit</u>
A.1.	<u>Economy and Efficiency.</u> The Army will better utilize existing test equipment for the Abrams tank and Bradley fighting vehicle.	<u>Funds Put to Better Use.</u> The Army could avoid losing \$58.4 million of utility from existing equipment (or \$46.5 million of procurement costs for new equipment ) and \$15.4 million in interest costs required to support premature procurements over the 6-year Future Years Defense Program.
A.2	<u>Economy and Efficiency.</u> The Army will identify the high priority needs for contact test sets that could avoid costs of unneeded automatic test equipment.	<u>Funds Put to Better Use.</u> Monetary benefits cannot be quantified.
A.3.	<u>Economy and Efficiency.</u> The Army will identify opportunities to reduce procurements of test equipment for the Abrams tank and Bradley fighting vehicle.	<u>Funds Put to Better Use.</u> Unneeded procurements valued at \$10 million have already been canceled. Additional monetary benefits cannot be quantified.
A.4.	<u>Internal Control.</u> Helps ensure implementation of Recommendations A.1., A.2., and A.3.	Included in A.1., A.2., and A.3. .

**APPENDIX D: SUMMARY OF POTENTIAL MONETARY AND OTHER BENEFITS  
RESULTING FROM AUDIT (cont'd)**

<u>Recommendation Reference</u>	<u>Description of Benefit</u>	<u>Amount and or Type of Benefit</u>
B.1.	<u>Economy and Efficiency.</u> The Army will better utilize existing test equipment for the TOW missile.	<u>Funds Put to Better Use.</u> The Army could avoid losing \$75.5 million of utility from existing equipment (or \$23.1 million of procurement costs for new equipment) and \$5.2 million in interest costs required to support premature procurements over the 6-year Future Years Defense Program.
B.2.	<u>Internal Control.</u> Helps ensure implementation of Recommendation B.1.	Included in B.1.
C.1.	<u>Economy and Efficiency.</u> The Army will determine the need for electro-optical test equipment for the Abrams tank.	<u>Funds Put to Better Use.</u> The Army could avoid procuring up to 219 electro-optical augmentation devices valued at \$137.8 million over the 6-year Future Years Defense Program.
C.2.	<u>Internal Control.</u> Helps ensure implementation of Recommendation C.1.	Included in C.1.

APPENDIX D: SUMMARY OF POTENTIAL MONETARY AND OTHER BENEFITS  
RESULTING FROM AUDIT (cont'd)

<u>Recommendation Reference</u>	<u>Description of Benefit</u>	<u>Amount and or Type of Benefit</u>
D.1.	<u>Economy and Efficiency.</u> The Army will improve its utilization of commercial equivalent equipment thereby reducing requirements for additional acquisitions.	<u>Funds Put to Better Use.</u> The Army could avoid spending at least \$5.4 million for the acquisition of additional commercial equivalent equipment.
D.2.	<u>Economy and Efficiency.</u> The Army may identify opportunities to reduce procurements of commercial equivalent equipment.	<u>Funds Put to Better Use.</u> Monetary benefits cannot be quantified.
D.3.	<u>Internal Control.</u> Helps ensure implementation of Recommendations D.1. and D.2.	Included in D.1. and D.2.





APPENDIX F: REPORT DISTRIBUTION

Office of the Secretary of Defense

Assistant Secretary of Defense (Production and Logistics)  
Assistant Secretary of Defense (Public Affairs)  
Comptroller of the Department of Defense

Department of the Army

Secretary of the Army  
Assistant Secretary of the Army (Financial Management)  
Army Audit Agency

Defense Agency

Director, Defense Contract Audit Agency  
Director, Defense Logistics Agency  
Director, Defense Logistics Studies Information Exchange

Non-DoD Activities

Office of Management and Budget  
National Security Division, Special Projects Branch  
U.S. General Accounting Office  
NSIAD Technical Information Center

Congressional Committees:

Senate Subcommittee on Defense, Committee on Appropriations  
Senate Committee on Armed Services  
Senate Committee on Government Affairs  
Senate Ranking Minority Member, Committee on Armed Services  
House Committee on Appropriations  
House Subcommittee on Defense, Committee on Appropriations  
House Ranking Minority Member, Committee on Appropriations  
House Committee on Armed Services  
House Committee on Government Operations  
House Subcommittee on Legislation and National Security,  
Committee on Government Operations





**PART IV - MANAGEMENT COMMENTS**

Department of the Army



COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT)



DEPARTMENT OF THE ARMY  
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR LOGISTICS  
WASHINGTON, DC 20310-0500



DALO-SMC

11 OCT 1991

MEMORANDUM THRU

DEPUTY CHIEF OF STAFF FOR LOGISTICS

~~DIRECTOR OF THE ARMY STAFF~~ <sup>H 10/16</sup> MARCIA R MORGAN LTC GS ADAS

~~ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS, LOGISTICS AND ENVIRONMENT)~~ <sup>(Army Public)</sup>

<sup>Assistant Deputy for Logistics</sup>  
DASA (I&L)

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

SUBJECT: Audit Report on DOD Maintenance and Diagnostic  
Systems-Army (Project No. OLB-0087.01)--INFORMATION MEMORANDUM

1. The subject report was reviewed as requested. Comments on the findings, recommendations, and potential monetary benefits are provided for your consideration (Tab H).
2. The enclosed response constitutes the Department of the Army's position regarding this draft audit.

Encl

*William F. Reed*  
JAMES W. BALL  
Major General, GS  
Director of Supply  
and Maintenance

CF:  
SAIG-PA

DASA (I, L&E) - Concur, COL Mallory/55225 (conference)  
ODCSOPS - Concur, MAJ Henderson/32965 (conference)  
CASARDA - Concur, Ms. Blas/43978 (by phone)  
ATA (AMXTM) - Concur, Mr. Dubois/746-1134 (by phone)

MAJ Newby/53280

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

DODIG Audit Report, DOD Maintenance and Diagnostic Systems-Army  
Project Number OLB-0087.01

**Finding A - Replacement of Automatic Equipment for the Abrams  
Tank and Bradley Fighting Vehicle**

**FINDING:** The Army Planned to prematurely replace its simplified test equipment for the Abrams tank and Bradley fighting vehicle with contact test sets developed under its Integrated Family of Test Equipment program. Additionally, planned procurements of the simplified test equipment exceeded requirements. These conditions occurred primarily because internal control practices were not sufficient to ensure full compliance with Army planning regulations requirements to prepare requirements, cost, and economic analyses to determine if planned acquisitions are cost effective and economically justified. The Army could avoid losing \$58.4 million of utility from its current automatic test equipment over the 6-year Future Years Defense Program by delaying replacement of this equipment. Interest costs of \$15.4 million required to support the premature procurement over the 6-year Future Years Defense Program could also be avoided. At the time of the audit, the Army had already taken action to stop \$10 million in excess procurements of simplified test equipment.

**MANAGEMENT COMMENTS:** The premature replacement finding is based on an assumption of a 20 year economic life for the simplified test equipment (STE). The Intermediate Forward Test Equipment\* Cost and Operational Effectiveness Analysis (COEA), dated January 1989, used a 20 year sustainment period for comparative cost purposes. However, use of an assumed 20 year economic life for determining utility of the STE is not in accordance with Office of Management and Budget (OMB), Department of Defense (DOD), and Department of the Army (DA) guidelines.

(1) Economic life is defined as that period of time over which one can reasonably expect benefits to accrue from a product and is subject to limitations imposed by the technological, physical, and mission usefulness of the item. The DOD Economic Analysis Handbook (chapter II, paragraph B3a) established maximum economic lives of 8 and 10 years for automatic data processing equipment (ADPE) and operating equipment respectively for use in economic life of DOD resources "...may be further limited by military or political consideration which may suggest benefits accrual for a much shorter period..." the DOD Unit Cost Resourcing Guidance (Section II, paragraph D1f) states economic lives of 5 and 10 years respectively for the same types of equipment. The OMB Circular A-76 (Part IV, Appendix C) shows an economic life for ADPE of 8 years, and 11 years for operating equipment of the type in question. The effective operating life

\*Name subsequently changed to Integrated Family Test Equipment.

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

of most of the Army's test, measurement, and diagnostic equipment (TMDE) has been set at 7 years as addressed in a study prepared Life-Cycle-Cost Economic Analysis for Test, Measurement, and Diagnostic Equipment (Publication 1584-012-2128).

(2) In addition to the published guidance on economic life of equipment, the DOD Life Cycle System Management Model (LCSMM), as described in Army Regulation (AR) 70-1, requires an upgrade/replacement review 5 to 10 years after the first unit equipped date (FUED). Purpose of the review is to assess continued capability of the system to meet mission needs, requirement for an upgrade of useful life extension program, impact of technological changes on system usefulness, and need for replacement as a result of system deficiencies. Since TMDE experiences a comparable impact from technological changes to that faced by supported systems, the need for a major upgrade of replacement of TMDE at approximately the same intervals is a reasonable expectation.

(3) The published guidance and the LCSMM provide a solid basis for establishment of and assumed economic life of 7 to 8 years for the STE rather than the 20-year life addressed in the audit. Assumption of a more reasonable economic life of 7 years means the utility of 2,636 of the STE systems at issue will be completely exhausted by FY95. These 2,636 systems represent almost 60 percent of the total planned inventory of about 4,700 systems. Current plans for fielding of 43 percent of the replacement systems in FY94 and 17 percent in FY95 are consistent with the expected expiration of the economic life of the fielded STE systems.

b. The lost utility and interest cost savings calculations are based on an assumed economic life of 20 years for the STE. Use of a more realistic estimated economic life of 7 years eliminates all potential savings arising from remaining utility and avoided interest costs.

c. On the basis of contracts awarded in May 1991, the unit cost estimates for the CTS have been reduced since the most recent update of the FYDP. Current estimate is \$15,000 for the ruggedized version of the lightweight computer unit (LCU). The 1,182 CTSs planned as replacements for STE systems supporting the Abrams tank and Bradley Fighting Vehicle System (BFVS) will cost approximately \$18 million as compared to the \$70 million cited in the draft audit report. Revised unit costs were provided to the DODIG auditors during their visit to the U.S. Army TMDE Activity; however, the revised cost estimates are not reflected in the final draft report. The introductory background paragraph in Part I of the draft audit report incorrectly states the 5-year planned spending for IFTE as \$2.6 billion. The correct programmed cost is approximately \$0.6 billion.

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

d. The draft audit report cites the "valid requirement" and "economic justification" criteria from AR 750-43 and the AR 71-9 requirement for an effectiveness analysis to support decision milestones as the basis for an allegation that "the Army did not adequately plan for the acquisition and deployment of contact test sets for the Abrams tank and Bradley Fighting Vehicle." However, the Army has met the cited requirements in the planned acquisition of CTSs. The requirement for the CTS is addressed in an approved Required Operational Capability (ROC) document and in the January 1989 COEA prepared for the Milestone IIIa decision. A follow-on COEA, to support the Milestone IIIb decision, is in process and will also address the use of CTSs. The January 1989 COEA looked at CTS and equivalent system specific equipment in all seven study alternatives. The CTS was viewed as a part of the overall maintenance support structure and was not singled out for a one-on-one comparison with the STE or other systems. This approach was consistent with Army policy and the stated study objectives. Both the January 1989 and the earlier May 1985 COEAs prepared for the IFTE program and the analysis which is nearing completion attest to the cost effectiveness of general purpose Automatic Test Equipment (ATE) over system specific equipment. One of the primary objectives of the Army's standard ATE policy is to reduce costs by fielding a general purpose IFTE to replace system specific test equipment and to meet future test equipment requirements. The COEAs have proven this to be a cost-effective approach.

e. The auditors contend two COEAs "sponsored by the Program Manager for Test, Measurement, and Diagnostic Equipment" are inadequate. The sponsorship attribution is incorrect. The study sponsor for both COEAs was the U.S. Army Training and Doctrine Command (TRADOC) and the performing activity was their TRADOC Analysis Command (TRAC). Study contributors included HQDA, HQ U.S. Army Materiel command (AMC), Combined Arms Support Command (CASCOM), Program Manager for Test, Measurement, and Diagnostic Equipment (PM TMDE), U.S. Army Signal Center and School, Rand Corporation, and Martin Marietta Aerospace. The COEAs were performed in the context of an Army war gaming scenario, comprehensive with respect to the numbers of test equipments and weapons systems modeled, staffed by TRADOC with all appropriate Army agencies and commands in accordance with established study procedures and regulations, and validated and approved by TRADOC as adequate. The analysis in the IFTE COEA were conducted in the framework of consolidated maintenance in which a general purpose test set or station can service several weapon systems at the same location. In the January 1989 COEA, general purpose IFTE components--the Base Shop Test Facility (BSTF) and CTS--were compared to the base case of currently fielded ATE and to a continuation of the past Army practice of employing system specific ATE for new weapon systems and upgrades. That COEA did not specifically address a piece of IFTE versus a specific

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

fielded system. However, the STE and the Direct Support Electrical system Test Set (DSESTS) were included as part of the base case of TMDE currently fielded to support the Abrams (M1), Bradley (M2), and 22 other weapon systems. The January 1989 COEA reached two major conclusions:

(1) Because of the cost of contractor maintenance associated with weapons systems in the field, including the Abrams and Bradley supported with STE and DSESTS, it would be substantially more cost effective to replace existing equipment with either general purpose IFTE or system specific ATE.

(2) General purpose IFTE is approximately twice as cost effective as developing system specific ATE to replace existing equipment such as STE and DSESTS.

The IFTE COEAs addressed the correct and overriding issue: that of the Army standard ATE versus system specific ATE. Analyses which attempt to compare a system specific application of the IFTE--in lieu of its general purpose application--to system specific fielded ATE on a one-for-one basis (e.g., STE and DSESTS for M1 and M2 versus IFTE limited to support of the M1 and M2) are not consistent with the Army's ATE policy of with the TRADOC Study Program established under the provisions of AR 5-5.

f. The auditors reached the conclusion that existing equipment is reliable. That conclusion is not consistent with previous audit results.

(1) An April 1987 General Accounting Office (GAO) audit found that of 5,539 wheel and track vehicles assigned to 602 company-size units, 4,915 were assigned to five divisions that had previously reported 82 to 93 percent of their vehicles as fully mission capable even though 50 percent had deficiencies which made them inoperable. The audit further found that unit personnel rarely used diagnostic equipment available for trouble shooting. The report states reasons for nonutilization were "that sets were too cumbersome and time consuming to use and personnel did not know how to use them." The GAO concluded in the April 1987 audit that user level maintenance personnel were not identifying and correcting vehicle deficiencies and that ". . . the Army is making only limited use of diagnostic equipment at the organizational level, relying instead on trial and error substitutions, a practice that is not only time consuming but is also costly in terms of parts." Nonutilization of the STE was also documented in the TRAC-WSMR TEX-XX-91 TMDE Abrams/Bradley Post Fielding Training Effectiveness Analysis report which shows that of a sample of 20 military occupational specialty (MOS) 63T and 19 MOS 63E personnel, none use the STE.

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

(2) The STE has been such a problem that the basic maintenance courses for the Abrams and Bradley no longer include training on the equipment. Now, STE training is included only in the advanced courses. Because of problems with STE, MG McVey, Program Executive Officer for Armored Systems Modernization, chartered an Abrams/Bradley Joint Working Group (JWG) to develop alternatives to the STE. The alternative selected by the JWG, and approved by MG McVey, was the CTS with an expert system maintenance aid.

(3) The CTS is general purpose ATE that will alleviate diagnostic equipment deficiencies through enhanced portability and use of expert systems and "paperless" technology.

g. The draft audit report cites August 1988 and April 1990 analyses prepared for the U.S. Army-Tank Automotive Command (TACOM) as evidence that CTS would provide no better diagnostic capability than STE. This may be true when the STE is used; however, it is not being used as it should be because it is bulky, unreliable, and time-consuming for diagnostic purposes.

h. The audit report further cites two cost analyses prepared by TACOM in contending the CTS offers no significant cost advantage over existing ATE. These cost analyses are no longer valid, however, since they use CTS unit costs which are now more than three times the projected amount.

i. The Apache CTS requirements have been validated only recently by the U.S. Army Ordnance Missile and Munitions Center and School (OMMCS). Follow-on adjustments to the IFTE Baseline Cost Estimate (BCE) and COEA will reflect these changes. With the reduced unit cost estimates for CTS, the PM-TMDE will be able to satisfy requirements for some systems sooner than originally anticipated. The Apache requirements will be prioritized along with other requirements for CTSs and will be satisfied as soon as possible to minimize costly interim support solutions.

RECOMMENDATION A-1: Prepare a requirements, cost, and economic analysis for the CTS for the Abrams tank and the BFVS to determine if the acquisition is cost effective and economically justified. If the acquisition is determined to be economically justified, a transition plan should be established that will optimize the investment in the existing simplified test equipment for the Abrams tank and the BFVS by incrementally transitioning to CTS for these weapon systems near the end of the economic life of the simplified test equipment.

ARMY POSITION: Nonconcur. The January 1989 COEA for IFTE and the revision which is now in process address the CTS as a component of the general purpose ATE study alternatives for three



COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS  
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different deployment strategies. The January 1989 COEA found general purpose ATE to be at least three times more cost effective than the base case and almost twice as cost effective as system specific ATE in all deployment scenarios. Comparing proposed general purpose ATE one-on-one against a specific piece of fielded system specific ATE will usually result in no cost advantage for transitioning to general purpose ATE. However, on a wider scale, such as that addressed in the COEA, general purpose equipment becomes substantially more cost effective since fewer pieces of TMDE are required, transportability requirements are reduced, and sustainment costs are less. One-on-one comparisons are contrary to TRADOC Study Program policy, will block implementation of the Army's standard ATE policy and will foster continuation of the expensive and technologically inferior practice of proliferating system specific ATE. All analyses to date have confirmed the cost effectiveness of the Army's standard ATE policy and use of general purpose ATE. Additional analyses are not considered appropriate. Transition plans for the CTS will be worked with the combat developer and will be based on priority needs of the Army units requiring the equipment.

RECOMMENDATION A-2: Determine the savings that can be realized from providing earlier deployments of CTS to weapons systems, such as the Apache Helicopter, that may have a priority need for new or replacement ATE. The Army's response to this report should enumerate any estimated savings identified.

ARMY POSITION: Concur. The PM-TMDE will work with OMMCS, Program Manager Advanced Attack helicopter (AHH), and other weapon system managers to determine priority requirements, from both an operational need and cost-effectiveness standpoint, for fielding of CTS. Since the unit cost estimate for the CTS is considerably lower than that used in the most recent update of the FYDP, more systems can be procured within the funding guidance. This will enable fielding to meet more of the higher priority requirements. Estimated cost savings from the earlier satisfaction of Apache and other requirements cannot be determined at this time as decisions on distribution of CTS have not been revised to reflect the potential for increased quantities.

RECOMMENDATION A-3: In conjunction with TACOM and other applicable commands, continue to review requirements for simplified test equipment of the Abrams tank and Bradley Fighting Vehicle, and take action to cancel any additional procurements that are determined to be unnecessary.

ARMY POSITION: Concur. The PM-TMDE will work with OMMCS and TACOM personnel to identify future requirements for the STE and the optimum time for replacement of the existing equipment with

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

CTS. Additional STE procurements will be recommended for cancellation if they are determined to be unnecessary because of force structure changes or earlier than projected availability of CTS.

RECOMMENDATION A-4: Report and track the material weaknesses related to compliance with the planning requirements of AR 750-43 and 71-9 as related to acquisition of CTS.

COMMENTS ON ESTIMATED MONETARY BENEFITS: Nonconcur. The estimate of potential monetary benefits stated in the draft audit report is based on an assumed economic life of 20 years for STE. As discussed in Management comments above, a 7 year economic life assumption is more appropriate and is in line with published OMB, DOD, and DA guidance. Use of a 7-year useful life for depreciation purpose shows no potential savings attributed to the remaining utility of the STE and no interest cost associated with the alleged premature replacement of the equipment with general purpose ATE.

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

DODIG Audit Report, DOD Maintenance and Diagnostic Systems-Army  
Project Number OLB-0087.01

**Finding B - Replacement of Electro-Optical Automatic Test Equip-  
ment for the Bradley Fighting Vehicle**

**FINDING:** The Army planned to prematurely replace portable electro-optical automatic test equipment for the Tube-launch Optically-tracked Wire-guided (TOW) missile on the Bradley Fighting Vehicle with an electro-optical augmentation of the contact test sets developed under its Integrated family of Test Equipment Program. This condition occurred primarily because internal control practices were not sufficient to ensure full compliance with Army planning regulations requirements to prepare requirements, cost, and economic analyses to determine if planned acquisitions were cost-effective and economically justified. The Army could avoid losing \$75.5 million of utility from its existing electro-optical test equipment over the 6-year Future Years Defense Program by delaying this equipment's replacement. Interest costs of \$5.2 million required to support the premature procurements over the 6-year Future Years Defense Program could also be avoided.

**MANAGEMENT COMMENTS:** Disagree with specific statements and the implications of the finding. The following comments are submitted for accuracy and objectivity:

a. The premature replacement finding is based on an assumption of a 20-year economic life for the current TOW electro-optical (EO) tester. However, use of an assumed 20-year economic life for determining utility of the TOW EO tester is not in accordance with OMB, DOD, and DA guidelines.

(1) The Management Comments, related to economic life in response to Finding A, are applicable to Finding B.

(2) The published guidance and the LCSMM provide a solid basis for establishment of an assumed economic life of 7 to 8 years for the TOW EO tester rather than the 20-year life addressed in the audit. Assumption of a more reasonable life of 7 years means 69 percent of the test equipment in question will be fully depreciated by the end of FY96. Thus, the \$80.7 million loss reflected in the draft audit report (\$75.5 million for lost utility and \$5.2 million for interest costs) is not an issue since current plans call for only a 61 percent replacement by that time.

b. The draft audit report cites ARs 750-43 and 71-9 in stating "new equipment must have a valid requirement, must be economically justified, and must have an effectiveness analysis."

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

to support decision milestones throughout the acquisition of the automatic test equipment." It uses the statement as the basis for concluding that "the Army did not adequately plan for the acquisition and deployment of the electro-optical augmentation of the contact test sets for the TOW missile." However, the Army has met the cited requirements in the planned acquisition of the CTS EO augmentation.

(1) The requirement for EOA of the CTS to perform on-system alignment for supported EO systems is stated in the August 1989 ROC for the IFTE. The EO testing requirement in the forward area is being met today with a multitude of different testers in support of fielded weapon systems. Those testers vary greatly in capability, reliability, weight, and cost. The only EO testing support available at the organizational level for the TOW/Bradley Integrated Sight Unit (ISU) is provided by the Day/Night Sight Collimator. That equipment has the capability to check the boresight of the Forward Looking Infrared (FLIR) to the TOW tracker receiver. However, it does not provide an acceptable means for measurement of critical FLIR parameters such as minimum resolvable temperature (MRT) and dead, strapped, or noisy channels. The CTS EOA will meet EO testing requirements that cannot be satisfied with currently fielded equipment, provide more comprehensive testing, and eliminate the operator uncertainty that exists today. Test program sets (TPS) to be developed for the CTS-EOA will provide full diagnostics for evaluation of the FLIR in the ISU, and MRT measurements will be provided at the system level.

(2) The December 1990 IFTE Electro-Optical Program Cost/Benefit Analysis (CBA), prepared for support of the Milestone II acquisition decision, addressed the cost-effectiveness issue. The purpose of the CBA was to assess the relative benefits and relative costs of two alternative methods of developing automatic EO testing capability for use on and off 16 customer weapons systems. The on-system analyses compared general purpose versus system specific EOA to the IFTE CTS.

(3) The best technical approach (BTA), identified in the Concept Formulation Package (CFP), augments the current IFTE assets with EO testing capability. Therefore, the CBA considered only alternatives which augment current IFTE systems with EO capability. It did not consider EOA alternatives which replace currently fielded EO test equipment. The rationale for this study approach is stated in the CBA: "In some cases EO ATE alternatives will replace currently fielded EO test equipment. In other cases, they will provide EO testing capability where none existed. The replaced equipment does not, however, qualify as the base case equipment. This is because it is generally manual, system specific equipment. In addition, it services only

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

old EO LRUs and cannot be upgraded to accommodate the proliferation of new electro-optics the Army plans to field." The CBA concluded that general purpose EOA to CTS was substantially less expensive than system specific EOA. Reduction in requirements for personnel, military occupational specialties (MOS), and training, as well as better utilization of the test equipment, all contribute to the cost effectiveness of the general purpose alternative.

RECOMMENDATION B-1: Prepare a requirements, cost, and economic analysis for the EOA of the CTS for the TOW missile to determine if the acquisition of the augmentation is cost-effective and economically justified. If the acquisition is determined to be cost effective and economically justified, a transition plan should be established that will optimize the investment in the existing portable EO test equipment by incrementally transitioning to EOA devices near the end of the economic life of the portable EO test equipment.

ARMY POSITION: Nonconcur. The December 1990 IFTE EO Program CBA found that the general purpose EOA of the CTS was 2.6 times less expensive than system specific augmentation. The general purpose CTS component of the IFTE program was shown to be cost effective in the January 1989 COEA and in the revision which is now in process. The CTS was addressed as part of the general purpose ATE structure for the three different deployment strategies analyzed. The COEA found general purpose ATE to be at least three times more cost effective than the base case and almost twice as cost effective as system specific ATE in all deployment scenarios. Since the cost effectiveness of general purpose ATE-- (in this case, the CTS)-- has been documented and general purpose EOA of the CTS was found to be cost effective in the December 1990 CBA, no further analyses should be needed to demonstrate the economic justification for acquiring and fielding the CTS with EOA. As discussed in the Management comments section above, many of the TOW EO testers in the field have exceeded their economic lives. Transitioning plans for replacing the existing equipment will be worked with the combat developer and will be based on the IFTE laydown which is near completion. The laydown is based on the latest force structure projections.

RECOMMENDATION B-2: Report and track the material weaknesses related to compliance with the planning requirements of AR 750-43 and 71-9, as required by DOD Directive 5010.38, "Internal Management Control Program."

COMMENTS ON ESTIMATED MONETARY BENEFITS: Nonconcur. The estimate of potential monetary benefits stated in the draft audit report is based on an assumed economic life of 20 years for the TOW EO tester. As discussed in the Management comments section above, a 7-year economic life assumption is more appropriate and

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

is in line with published OMB, DOD, and DA guidance. Use of a 7-year economic life for depreciation purposes negates the potential savings attributed to the remaining utility of the TOW EO testers and interest costs associated with the alleged premature replacement of the equipment.

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

DODIG Audit Report, DOD Maintenance and Diagnostic Systems-Army  
Project Number OLB-0087.01

Finding C - Requirements for Electro-Optical Test Equipment for  
the Abrams Tank

**FINDING:** The Army did not adequately justify the need for new electro-optical test equipment for the Abrams tank. This condition occurred primarily because internal control practices were not sufficient to ensure full compliance with Army planning regulation requirement to prepare requirements, cost, and economic analyses to determine if planned acquisitions are cost-effective and economically justified. As a result, there was no assurance that planned procurement of 291 electro-optical augmentation test equipment devices, costing \$137.8 million, over the 6-year future Years Defense Program, are necessary./

**MANAGEMENT COMMENTS:** Disagree with specific statements and the implications of the finding. Following comments are submitted for accuracy and objectivity:

a. The draft audit report charges "the planned procurement of electro-optical devices were not adequately justified." It cites ARs 750-43 and 71-9 in stating that "new test equipment must have a valid requirement, must be economically justified, and must have an effectiveness analysis to support decision milestones." The EOA of the CTS meets the criteria cited.

(1) The requirement for EOA is documented in the IFTE ROC dated 16 August 1989. At present, no equipment exists at the organizational level for testing the M1 (Abrams) Gunners Primary Sight (GPS). Self test on the tank checks electrical and mechanical operation and is performed from an operator's manual. At the direct support (DS) level, the GPS has Direct Support Electrical System Test Set (DSETS) for electronic testing only (no optical capabilities). There is no ATE currently fielded for optical checkout of the M1 GPS below the depot maintenance level. The TPSSs to be developed for the CTS EOA will provide full diagnostics for evaluation of both the FLIR and the LRF including the extinction co-efficient test at the organizational level.

(2) Economic justification and effectiveness analysis of the EOA of the CTS is contained in the IFTE EO Program CBA dated December 1990, which was a part of the documentation for the Milestone II acquisition decision. The objective of the CBA was to provide a relative comparison of the costs and benefits of alternative methods developing EO ATE augmentation to the IFTE.

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The CBA showed the general purpose on-system augmentation alternative (i.e., CTS-EOA) to be substantially less expensive than the system specific augmentation alternative. In addition to the conclusions of the CBA, the January 1989 COCA for the IFTE found general purpose test equipment to be more cost effective than the base case of currently fielded equipment and system specific equipment for all alternatives considered. Augmentation of current IFTE assets with EO testing capability was identified as the test technical approach in the concept formulation package for the EO program. That conclusion, the findings of the December 1990 CBA, and the Army's standard ATE policy all support acquisition of general purpose EOA for the CTS.

b. The auditors have questioned the adequacy of the analyses prepared by the U.S. Army Training and Doctrine Command (TRADOC) because they "did not include adequate evaluations of any existing deficiencies in the present simplified test equipment or assess other alternatives for testing the EO capability of the Abrams tank." Since the fielded STE supporting the M1 (Abrams) tank and the BFVS does not have EO testing capability, it was not a viable alternative for consideration in the CBA. The CBA assessed the benefits and cost effectiveness of general purpose versus system specific EOA of the CTS. The Army policy is to use standard ATE unless system specific test equipment is proven to be less costly. The CBA confirmed the cost effectiveness of the general purpose CTS-EOA and is consistent with the Army policy and the conclusions from the previous IFTE COEA. In all analyses to date, general purpose ATE has proven to be more cost effective than system specific ATE.

c. Justification for the EOA was not driven primarily by the "no evidence of failure" history. Rather, the fundamental need arose from a conspicuous absence of adequate EO testing capability at the organizational and DS levels of maintenance. Reduction of the NEOF rate has been an issue for some time. All recent attempts to obtain specific and credible data on NEOF rates for the GPS have been unsuccessful. Opinions abound that NEOF is a problem, but factual information is scarce. The PM-TMDE has not committed to undertaking or sponsoring a NEOF study, but will raise the issue to the U.S. Army Materiel Readiness Support Activity for further action. The January 1989 COCA addressed NEOF in general terms and included a sensitivity analysis on the effect the use of the CTS would have on the NEOF rate. The results of the analysis showed a 20 percent reduction in NEOF at a specified demand rate when using ATE with CTS versus utilizing ATE without its associated CTS.

d. The audit report implies that a software change may be the answer to the NEOF experience with the EO systems removed from the turrets of the M1 tank. However, the STE-M1/FVS does not have any EO testing capability, so a software change has no bearing on the issue at hand.



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e. In response to the overstatement of quantities issue, the Army requirements are based on a workload analysis and laydown by TRADOC. The requirements to support the Abrams tank are as follows:

Areas support teams:

Track vehicle repair team	66 (NO EOA)
Tank Turrent repair team	33 (With EOA)
Divisional maintenance support teams	183 (With EOA)
Training base requirement	72 (With EOA)
Total direct support requirement	353
Total requiring EOA	(287)

These requirements were provided to the DODIG audit team by the U.S. Army Ordnance Missile and Munitions Center and School (OMMCS).

f. Each maintenance team responsible for EO diagnosis must be identically equipped. Historical knowledge that 10 percent of the maintenance calls have involved an EO problem cannot be applied to the number of EO test sets required or to the number of maintenance teams requiring EOA. At the time a maintenance team is notified of a failure, the cause of the failure is not normally known. If the EOA is not available, the fault cannot be isolated to either an electronic or EO component. Therefore, the divisional maintenance support teams as well as the area support tank turret repair teams need EOA devices.

g. The Army is planning to procure only four prototype EOA devices for full-scale engineering development, due to be completed by the third quarter of FY93. Prior to the production (Milestone III) decision in the third quarter of FY93, A COCA will be prepared to address cost effectiveness of the EOA as well as quantity requirements to support the Abrams tank and other Army weapon systems. This analysis will be performed within the bounds of the Army's TMDE policies and projected force structure at the time of the study.

h. The finding is misleading in stating the quantities planned for procurement. The funded program for the period FY94 through FY97 provides for procurement of 77 EOA devices at an estimated cost of \$15.4 million. This is in contrast to the quantity of 219 and \$1137.8 million which is stated in the draft audit report. The long-range plan is to procure 287 systems to meet the identified requirement. However, this is a long-range plan and is subject to revision as requirements change, funding is adjusted, and more definitive information becomes available on priority needs for fielded and new systems. At present, funding projections for the out-years are not adequate to cover known EO on-system and off-system test equipment requirements.

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RECOMMENDATION C-1: Delay making any decision to acquire EOA test equipment for the Abrams tank until a complete requirements, cost, and economic analysis is performed to determine if the acquisition would be cost effective and economically justified. This analysis should include an evaluation of the NEOF rate reported by Army units for maintenance of EO systems in the Abrams tank to determine the rate's effect on the requirement for EOA. If significant problems are found, the analysis should fully analyze alternative solutions for correcting the problems and choose the most cost effective method for implementation.

ARMY POSITION: Nonconcur. The December 1990 CBA confirmed the cost effectiveness of general purpose EOA to the CTS. It found that general purpose EOA of the CTS was substantially more cost effective than system specific augmentation. In addition, the general purpose CTS component of the IFTE program was shown to be cost effective in the January 1989 IFTE COCA and in the revision which is now in process. The CTS was addressed as part of the general purpose ATE structure for the three different deployment strategies analyzed. The COCA found general purpose ATE to be at least three times more cost effective than the base case and almost twice as cost effective as system specific ATE in all deployment scenarios. Since the cost effectiveness of general purpose ATE has been proven and general purpose EOA of the CTS was found to be cost effective in the December 1990 CBA, no further analyses should be needed to demonstrate the economic justification for acquiring and fielding the CTS with EOA. Further, since no equipment exists at the organizational level at present for EO testing of the M1 GPS, general purpose EOA of the CTS will fill the need in a cost effective manner that is consistent with the Army's standard ATE policy.

RECOMMENDATION C-2: Report and track the material weaknesses related to compliance with the planning requirements of ARS 750-43 and 71-9, as required by DOD Directive 5050.38, "Internal Management Control Program."

ARMY POSITION: Nonconcur. The Army is in compliance with ARS 750-43 and 71-9 as related to the acquisition of CTSs and the EOA; therefore, the internal control material weaknesses discussed in the draft audit report do not exist.

COMMENTS ON ESTIMATED MONETARY BENEFITS: Nonconcur. Potential monetary benefits stated in the draft audit report are related to the question of need and cost effectiveness of EOA of the CTS. Since the need is valid and documented and the cost effectiveness of general purpose EOA has been confirmed, potential savings are not an issue. The potential for savings discussed in the draft audit report (i.e., \$137.8 million over a 6-year period) assumes all stated requirements for the IFTE EO program will be funded. Programmed funding at present for the CTS-EOA is only \$15.4 for the FY92 through FY97 timeframe.

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DODIG Audit Report, DOD Maintenance and Diagnostic Systems-Army  
Project Number OLB-0087.01

Finding D - Requirement for Commercial Equivalent Automatic Test  
Equipment.

**FINDING:** Government contractors and Army maintenance depots did not fully use commercial equivalent automatic test equipment. The Army Program Manager for Test, Measurement, and Diagnostic Equipment did not implement effective procedures for monitoring the utilization and distribution of Government-furnished equipment provided to Government contractors and Army maintenance depots. As a result, requirements for commercial equivalent automatic test equipment were overstated by at least \$5.4 million.

**MANAGEMENT COMMENTS:** Disagree with specific statements and the implications of the finding. The following comments are submitted for accuracy and objectivity:

a. Army Regulation 750-43 requires managers of ATE to identify any underutilized equipment to the PM-TMDE. However, the regulation does not place a requirement on the PM-TMDE for monitorship of utilization of the test equipment. Commercial equivalent equipment (CEE) systems of the IFTE program are normally procured for and funded by the customer--program executive officers (PEO), program managers (PM), Army test program set centers, and Army depots. The equipment is owned by the customer and its disposition must take into account the customers' needs, as well as utilization statistics. Army Regulation 750-43 provides for the PM-TMDE's recommending disposition of underutilized ATE to the Deputy Executive Director for TMDE (DEDT). In turn, the DEDT is to negotiate the redistribution with the affected major Army command. The PM-TMDE has developed a configuration data base that will capture varied information on all IFTE assets. Efforts are under way to expand the data base to capture utilization statistics. Once those efforts are complete, the PM-TMDE will be in a position to monitor utilization statistics, with dependence on the accuracy of information supplied by the owners of the equipment.

b. During the course of their work, the auditors found three CEEs which were not being fully utilized: one at Anniston Army Depot (ANAD) and two at Mantech Corporation.

(1) The system at ANAD was purchased for support of

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
LOGISTICS AND ENVIRONMENT) (cont'd)

the cobra Night Sight (C-NITE) program. Although a final decision had not been made on development of the TPSs for the C-NITE program when the procurement in question was initiated, the Army had to begin the process because of the procurement leadtime for the purchase. After the procurement action was finalized, reductions in the C-NITE program resulted in a diminished workload projection. Subsequent funding reductions and contractor production delays have led to a postponement of TPS development until FY92. Postponement in March 1991 of an effort to convert TOW Cobra TPSs from Missile automated Test Equipment to IFTE was another factor bearing on underutilization of the CEE at ANAD. Slips in planned programs led the U.S. Army Missile Command in April 1991 to pursue movement of the CEE from the depot to a TPS development contractor. completion of this action will avoid the purchase of one CEE system. While the TPS development programs requiring the CEE at ANAD were postponed, the test station did not go unused. It was used extensively to train depot personnel and familiarize them with the equipment.

(2) The two remaining systems at Mantech Corporation are being fully utilized at present for development of TPSs. Discussions with Mantech Corporation representatives to verify utilization have revealed that the systems are required for this next 8 to 10 months. After that, the system will be moved to an Army depot. The PM-TMDE will monitor continued utilization of these systems to confirm their need to Mantech Corporation or the depot to which they are to be transferred.

RECOMMENDATION D-1: Determine the CEE that is underutilized by requesting and evaluating utilization records provided by Army maintenance depots and government contractors, and redistribute the underutilized equipment to other Army maintenance depots and government contractors requiring such equipment.

ARMY POSITION: Nonconcur. The PM-TMDE will put into place a mechanism for collecting and evaluating utilization statistics for CEEs; however, the PM-TMDE can only recommend redistribution of equipment if it is not being fully used. The PM has no authority to direct redistribution of underutilized systems. final disposition of the equipment is at the discretion of the owner. Neither the PM-TMDE nor the DEDT can unilaterally initiate a redistribution action under the provisions of AR 750-43.

RECOMMENDATION D-2: Evaluate overall requirements for CEE and reduce or cancel unneeded planned procurements.

ARMY POSITION: Concur. The PM-TMDE will work with potential customers and attempt to satisfy their requirements with underutilized equipment. The PM-TMDE does not determine requirements for CEEs, but responds to customers' requests for procurement actions.

COMMENTS OF THE ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
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RECOMMENDATION D-3: Report and track the material weaknesses related to compliance with the monitoring and planning requirements of AR 750-43 as required by DOD Directive 5010.38, "Internal Management Control Program."

ARMY POSITION: Nonconcur. Army Regulation 750-43 does not require the PM-TMDE to monitor utilization of ATE. The requirement for identification of underutilization rests with the managers of fielded ATE. The PM-TMDE's role in the redistribution of underutilized ATE process as discussed in paragraph 4-8 of AR 750-43 to accept reports of underutilization of fielded ATE and to recommend disposition of the underutilized equipment to the DEDT. The PM is in compliance with the directive in the regard, so the material weaknesses discussed in the draft report do not exist.

COMMENTS ON ESTIMATED MONETARY BENEFITS: Concur. The PM-TMDE concurs in the finding that the CEE at ANAD is underutilized and can be relocated to meet a potential procurement requirement. The resulting savings will be \$1.8 million. The two systems at Mantech Corporation are being fully utilized and will not be redistributed at this time. When the contractor completes the current TPS development work, the systems will be relocated to an Army depot but will remain in support of the All Source Analysis System. That is to say, the CEEs in question will not be available to fill requirements for other weapon systems and their relocation will not reduce planned procurement quantities. Thus, the total potential monetary savings from this finding is \$1.8 million rather than the stated \$5.4 million. Any savings arising from redistribution of CEEs will accrue to the activity whose requirement is filled by the disposition. All CEEs are procured with customer funds, so none of the savings will be available to the PM-TMDE for reprogramming.



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