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**Use of off-the-shelf
electronic test equipment
to reduce costs, shorten
leadtimes, assure reliability,
and simplify logistics**

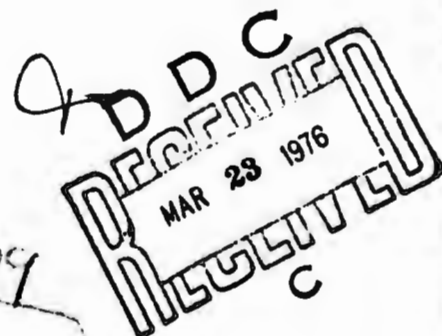
**Report of the Task Force on
Electronic Test Equipment**

February 1976

409609



DEFENSE SCIENCE BOARD
Office of the Director
of Defense Research
and Engineering
Washington, D.C.



Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) <u>Use of off-the-shelf electronic test equipment to reduce costs, shorten lead-times, assure reliability, and simplify logistics.</u>		5. TYPE OF REPORT & PERIOD COVERED <u>Technical Report</u>
7. AUTHOR(s) Defense Science Board Electronic Test Equipment Task Force		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Office of the Asst. Sec. of Def. (I&L) WS ✓ Director of Standardization and Support Washington, D. C. 20301		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) <u>124</u>		12. REPORT DATE <u>February 1976</u>
		13. NUMBER OF PAGES <u>130</u>
		15. SECURITY CLASS. (of this report) Unclassified
16. DISTRIBUTION STATEMENT (of this Report) Approved for release: Distribution unlimited		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) REQUIREMENTS: Performance goals for the support of major weapon system. Communication of "lessons learned." Military specifications. Automatic test equipment. Early announcement of anticipated requirements. PROCUREMENT: Procurement simplification. Cost of ownership. Increased use of bid samples.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report presents 28 recommendations based on the studies and deliberations over the past year of the Electronic Test Equipment Task Force of the Defense Science Board. The Task Force proposes methods of implementation for each of its recommendations and estimates that prompt and orderly implementation will yield savings on the order of \$80 million per year.		

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Prospective contractor qualifications. Proliferation control. Warranties. Enforcement of contract terms. Assignment of claims. LOGISTICS: Logistic support. Calibration and repair facilities. Replacement of older electronic test equipment. Commercial manuals. Provisioning data. Training. MANAGEMENT: Acquisition management. Followup on Task Force recommendations.

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OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

27 February 1976

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Final Report of Task Force on Electronic Test Equipment

The final report of the Task Force is respectfully submitted herewith. It is the result of a year's work of a Task Force whose membership was drawn from each of the Military Services and from nine private firms (six manufacturers and three users of electronic test equipment).

All Task Force members were highly dedicated to this effort. This was shown by their excellent participation in all Task Force deliberations and by their virtual 100% attendance at the monthly Task Force meetings.

All Task Force meetings were open to the public and each was attended by about 50 visitors from Government and industry. The visitors participated fully in all Task Force discussions and were represented in good number on the three Working Groups: Requirements, Procurement Practices, and Logistics. Thus, the input to the final report of the Task Force represented the views of the visitors as well as those of the Task Force members. As a result, the Task Force received special notice in the trade press for its openness and for including the visitors in its deliberations.

As might be expected, the Task Force was not unanimous in all of its recommendations and discussions. However, all recommendations presented in the report received majority approval by formal vote of the Task Force members. A strong request was made for statements of minority positions, and several have been included in the report. In fact, minority positions were encouraged as a means of providing greater understanding of the issues addressed by the Task Force.

All of the Task Force recommendations are important and are in the best interest of the Military Services, both for war readiness and cost effectiveness, but several key recommendations should be emphasized.

● Use of off-the-shelf electronic test equipment should be considered more completely during the early stages of weapon system development and during formulation of other needs for electronic test equipment. This would reduce acquisition costs and increase reliability by greater use of equipment that has a proven record of field performance. To have survived in the large industrial marketplace, such equipment must be priced competitively and perform well as judged by a wide range of users.

● The use of bid samples--the process of "fly before buy"--is strongly recommended as a good business practice. It always pays for a customer to examine beforehand the product that is being considered for purchase. Not only should the product be examined as to actual performance versus the manufacturer's claims, but the prospective buyer should assess the product's long-term reliability and the ability of the manufacturer to provide repair and other support services over the life of the product. Once procured, the product is subjected to examination through use. Why not conduct this review to a good degree prior to contract?

● To reduce paperwork and obtain timely deliveries at attractive prices, greater use of multiple-award Federal Supply Schedules is urged. This method of procurement provides a convenience that is not being fully exploited, particularly since electronic test equipment is catalog-listed at prices favorable, in most instances, to the Government.

● The general practice of not requiring manufacturers to service what they sell to the Military Services is in direct contradiction to commercial practice. The Services traditionally stock spare parts without considering commercial sources and as a result incur unnecessary costs. Further, the delivery of parts from the Services' supply centers is often poor.

● Manufacturers' services should be used more fully to repair electronic test equipment for several reasons. As instruments become more complex, they are more difficult to repair. The Services are finding it difficult to obtain and retain skilled repair personnel. Field repair facilities are increasingly expensive for the Services to maintain. Calibration and repair equipment is underutilized in many Service installations. Use of manufacturer repair services would strengthen mobilization readiness, particularly if the Services maintained some stock of replacement instruments to save money and ensure adequate repair performance.

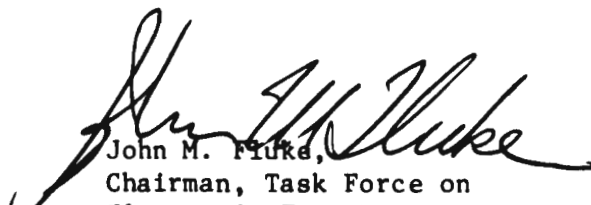
- The Services should plan to use standard manufacturers' warranties more fully. This is not done now because of procedural limitations within the Services. By not using commercial warranties, the Services overlook potential savings and limit feedback on product performance that is so vital to improved reliability.
- Much of the electronic test equipment in the defense inventory is outdated, underused, and costs too much to repair and calibrate. Prudent investment of resources to replace this equipment with new instruments will provide substantial cost savings and improve the capability and availability of test equipment.
- Logistic costs to support electronic test equipment are higher when the inventory includes a multitude of different instrument types--many represented only by small quantities. Standardization of instrument types for new procurement will reduce these support costs. However, standardization should not extend to the point where it reduces competition or induces procurement of obsolete equipment.

By conservative estimate, annual savings on the order of \$80 million can be achieved by implementing Task Force recommendations. Estimates had to be made because the Task Force was faced with a serious lack of accurate cost data from the Services. The savings cannot be made at once and without adequate planning. In some cases, money will have to be spent to achieve the predicted savings.

Task Force recommendations should be implemented promptly and not studied to the point of oblivion. The Task Force pursued its work to achieve results, not to create another study to be filed and forgotten.

All of us feel a continuing responsibility to the work of the Task Force in terms of strengthening the Nation's defenses. Hence, the report recommends that the Task Force continue for another year to help accelerate the results of our study. The last three recommendations address themselves to this proposed ongoing effort.

Each Task Force member contributed generously of his time and talents. Speaking both for the members and myself, it has been a privilege to serve on this Task Force. In this light, our report is respectfully submitted.


 John M. Fluke,
 Chairman, Task Force on
 Electronic Test Equipment

**Use of off-the-shelf
electronic test equipment
to reduce costs, shorten
leadtimes, assure reliability,
and simplify logistics**

**Report of the Task Force on
Electronic Test Equipment**

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INTRODUCTION

This report presents 28 recommendations based on the studies and deliberations over the past year of the Electronic Test Equipment Task Force of the Defense Science Board. The Task Force proposes methods of implementation for each of its recommendations and estimates that prompt and orderly implementation will yield savings on the order of \$80 million per year. These savings are tabulated under "Magnitude of Potential Savings," the last section of this introduction.

The Task Force was established by the Department of Defense (DOD) on October 25, 1974:

... to examine the greater use by the DOD of privately developed, commercially available off-the-shelf electronic test equipment, including modification thereof, with the goal of achieving economy and reliability benefits for the several Armed Services and to recommend policies and procedures which will maximize these benefits.

For purposes of the Task Force report, electronic test equipment includes all electronic devices used to measure, gauge, test, inspect, diagnose, or otherwise examine materials, supplies, and equipment to determine compliance with requirements established in technical documents. Off-the-shelf electronic test equipment (OTS ETE) is that electronic test equipment which is a developed product in regular production sold in substantial quantities to the general public at an established catalog price. Modified OTS ETE is any such equipment that has been modified even to a minor extent--such as by the addition of a military nameplate.

The main text of this report is organized in accordance with the 4 major areas investigated by the Task Force: requirements, procurement, logistics, and management. Each chapter presents a statement of a problem, recommendation(s) for resolving the problem, and the anticipated benefits that would result if the recommendations are carried out. A brief discussion of the problem is also presented along with suggestions for implementing the recommendation(s).

TASK FORCE APPROACH

The Task Force approached its work by comparing private business methods with DOD methods for acquiring electronic test equipment.

The Task Force met numerous times during 1975, and nearly all members attended every meeting. In each case when a member could not attend, he was represented by a person with authority to speak for him. At these meetings, the general public, usually between 50 and 100 people, participated in the discussions.

Three Working Groups were formed--Requirements, Procurement Practices, and Logistic Support. These groups held many meetings, visited various repair and calibration facilities, and heard presentations by selected agencies and groups. They also evaluated a great deal of information submitted by industry and government. However, all recommendations of the Task Force were discussed and voted on in plenary session.

THE ELECTRONIC TEST EQUIPMENT MARKET

According to a report by Creative Strategies, San Jose, California, in calendar 1974, sales of electronic test instruments by U.S. manufacturers came to \$1.39 billion (Electronic News, December 8, 1975). For the same period, the Department of Commerce reports that U.S. manufacturers shipped testing, measurement, and analyzing equipment (Product Code 38252) valued at more than \$1.25 billion (Survey of Business, August 1975).

Owing to differences in classification and procurement reporting systems among the Department of Commerce, the Department of Defense, and prime contractors who buy to meet needs of defense programs, DOD's share of the total market cannot be accurately determined. However, based on procurement reports for fiscal 1975 (excluding weapon-system monitoring automatic test equipment*), it is estimated to be between 35% and 40%.

Excluding automatic test equipment (ATE), in fiscal 1975 total procurement of electronic test equipment (ETE) for DOD is estimated at \$467 million, broken down as follows:

Purchases by major system prime and subcontractors	\$233,000,000
Purchases over \$10,000 by military agencies	184,000,000
Purchases under \$10,000 by military agencies	<u>50,000,000</u>
Total	\$467,000,000

* ATE is difficult to estimate in total. The total amount spent on diagnostic ATE can be estimated fairly accurately by suppliers, but total sales of weapon-system monitoring ATE is unknown.

Contractors do not separately report ETE purchases made in support of DOD major weapon systems. However, based on sales to prime contractors by industry members of the Task Force, the Task Force estimated that such purchases (excluding those for weapon-system monitoring ATE) reached a total of about \$233 million in fiscal 1975.

ETE purchases in excess of \$10,000 by the Military Services reached a total of \$184 million in fiscal 1975 (DOD Comptroller Report on "Military Prime Contractor Awards, 1975," p. 15).

It is estimated that ETE purchases under \$10,000 by the Military Services reached a total of about \$50 million in fiscal 1975 (based on GSA estimates of military purchases through Federal Supply Schedules plus estimates by the Task Force of other military purchases).

Of the total purchases by the Military Services, ETE valued at about \$57 million was procured through General Services Administration multiple-award Federal Supply Schedules (GSA estimate provided to the Task Force in its letter of December 23, 1975).

Based on data provided to the Task Force in March 1975 by the Army, Navy and Air Force, the Military Services have a 1975 ETE inventory carried at original cost of about \$1.8 billion, broken down as follows:

Army	\$636,600,000
Navy/Marine Corps	726,719,000
Air Force	<u>438,500,000</u>
Total	\$1,801,819,000

GENERAL CONCLUSIONS

Study, analysis, and professional judgment led the Task Force to conclude that:

- Collectively, private firms buy more ETE for their own use than the Military Services and major weapons systems contractors buy for defense use.
- Based on consideration of lifetime costs, ready availability, and reliability of equipment performance, private firms prefer to buy off-the-shelf electronic test equipment (OTS ETE).

- When the Military Services buy ETE, they often use or go to the great expense of preparing a Military Specification or other special purchase description that precludes the purchase of highly reliable, competitively priced, and readily available OTS ETE. In many cases, the Military Services go through a costly, time-consuming process when a suitable item of OTS ETE could be obtained through a simplified procurement process to fulfill the essential military need.

- The use of Military Specifications tends to freeze designs in a field noted for its dynamic change. As a result, much of the ETE newly procured by the Military Services fails to take advantage of advances in design embodied in the latest OTS ETE being produced in the United States and abroad.

- Spare and repair parts manufactured to Military Specifications or other special design specifications tend to be more costly and take longer to procure, produce, and accept than OTS ETE parts that perform identical functions. Since many parts manufactured specially for the Military Services are not interchangeable with their commercial counterparts, large reserve inventories must be established and maintained to ensure that the parts will be available in the event of a national emergency.

- The Military Services tend to use highly complex, enormously expensive networks of depots to distribute both specially designed and OTS ETE repair parts. To a very large extent, the military supply networks tend to duplicate--sometimes quadruplicate--the commercial network for the distribution of OTS ETE. Use of military depot systems rather than the commercial network for distributing OTS ETE repair parts far more than doubles the cost and often prolongs the time taken in providing such parts to the eventual user.

- The Military Services usually fail to take full advantage of manufacturers' or other readily available commercial sources for the repair and calibration of OTS and other ETE.

As a result of the foregoing, the Military Services pay more than private firms for the purchase and logistic support of ETE of equal value, availability, and reliability.

The main reasons why the Military Services pay more and wait longer for ETE and its logistic support appear to be that:

- The Military Services tend to overspecify performance requirements for ETE.
- Military procurement regulations, policies, procedures, and practices tend to delay and burden the acquisition process and thereby inhibit the purchase of OTS ETE, the use of OTS repair parts, and the use of commercial repair and calibration facilities.

The dearth of cost accounting data in the Military Services tends to hide the full impact of the indirect and overhead costs associated with the acquisition and logistic support of equipment built to Military Specifications and special purchase descriptions.

PROBLEMS AND RECOMMENDATIONS

The following extracts from the main text of the report summarize statements of problems and proposed recommendations in each of the 4 major areas related to OTS ETE studied by the Task Force: requirements, procurement, logistics, and management.

REQUIREMENTS

The identification and statement of requirements is the first step in the process of acquiring ETE. Decisions made at this time often have a crucial impact on the eventual success or failure of an acquisition program.

The Task Force explored major problems associated with the identification and statement of requirements. As a result of this exploration, the Task Force closely examined the issues and eventually formulated 7 recommendations concerning: Performance goals for the support of major weapon systems. Communication of "lessons learned." Military specifications. Automatic test equipment. Early announcement of anticipated requirements.

Performance Goals for the Support of Major Weapon Systems

Problem. When a new major system is conceived and its mission defined, the initial performance goals often tend to be overambitious. In many cases, all these optimistic goals harden into firm commitments before the lifetime costs of ownership of the ETE needed to achieve them are adequately taken into account.

Most of the ETE acquired for the Military Services is selected by and procured through major system prime and sub-contractors. In many cases, the Military Services, through their prime and subcontractors, are not taking full advantage of the time- and money-saving opportunities for using OTS ETE.

Recommendation 1. Strengthen major system review procedures to ensure that specific mission requirements are evaluated early and continuously in light of resulting logistic support costs of electronic subsystems and complementary requirements for electronic test equipment. Examine policies and procedures currently governing the acquisition practices in major system prime and subcontracting as they relate to the acquisition and logistic support of electronic test equipment. Modify these policies and procedures as necessary to promote, consistent with mission requirements, the cost-effective use of off-the-shelf and modified commercial electronic test equipment.

Communication of "Lessons Learned"

Problem. Any attempt to discover the root causes of logistic failures, delays, and cost overruns that have been associated with major Government programs is likely to reveal that "lessons learned" (both successes and failures) are not being passed along systematically in a timely and effective manner. This shortcoming is particularly evident in the acquisition of major weapon systems where--for such reasons as security classification, proprietary interest, and the natural disinclination to discuss mistakes--there has been a failure to profit from experience.

Recommendation 2. Formalize current procedures to ensure the timely inter-Service and intra-Service exchange of "lessons learned" in the selection, acquisition, logistic support, and use of electronic test equipment required for major weapon systems.

Military Specifications

Problem. Most Military Specifications for ETE require ETE of special design and manufacture. The use of Military Specifications is usually warranted when ETE must be custom-built to fulfill requirements that are unique to the Department of Defense. However, the Military Services often use Military Specifications calling for ETE of special design when modified commercial or OTS ETE would perform the required function.

The use of current Military Specifications tends to complicate and increase the cost of contract administration, delay delivery, foster the production of ETE of obsolescent design, sharply increase the costs of logistic support, and create operational, maintenance, and calibration problems. Moreover, many obsolete Military Specifications remain in the system.

Recommendation 3. Implement a procedure requiring justification for development of a new Military Specification where off-the-shelf electronic test equipment can meet the requirement. Augment resources as necessary to eliminate obsolete test equipment specifications in accordance with established procedures.

Recommendation 4. Raise the priority of the ongoing task of revising general Military Specification MIL-T-28800 and ensure that it facilitates the procurement of commercial off-the-shelf test equipment.

Recommendation 5. Reduce overapplication of specification requirements such as: Environmental requirements. Military parts, materials, and processes. Detailed specifications for specific categories of electronic test equipment (for example, MIL-O-24311--Oscilloscope). Qualified Products Lists (QPLs). Purchase descriptions, when they are redundant. Life-Cycle Costing (LCC), when not applicable. Total Cost Effectiveness (TCE), when not applicable. First Article Testing, when inappropriate. Excessive drawing and documentation requirements.

Automatic Test Equipment

Problem. Since the 1950's, advances in electronic technology have given rise to a need for faster, more detailed tests than can be accomplished with manual test equipment. In response to this need, the Government and industry have developed a diverse array of automatic test equipment (ATE). This rapid growth of ATE in itself has created new technical and management problems affecting maintainability, testability concepts, compatibility of prime system electronic design with test languages, and operator training. ATE requires a high level of use to justify its high initial cost, and its use tends to reduce the workloads of many manual, small-volume repair and calibration facilities.

Recommendation 6. Broaden and intensify DOD/Industry efforts to provide basic guidelines for the design, development, acquisition, use, and logistic support of automatic test equipment (ATE) so as to foster the compatibility, versatility, and optimum usability of such equipment for military and commercial applications. Promote the design of primary systems and subsystems so as to facilitate their testability with general-purpose automatic test equipment. Foster the selection and use of a common software test language. Require that the purchase of ATE be justified on the basis of adequate study of its economic and technical effectiveness.

Early Announcement of Anticipated Requirements

Problem. The response of electronic test equipment (ETE) manufacturers to the needs of the marketplace is a function of direct solicitation of potential customers and participation in various business forums. The ETE industry also studies current technical developments and endeavors to assess future electronic test needs of ongoing projects. However, the needs of the Military Services are not being communicated to the ETE industry as effectively as those of potential commercial customers.

Recommendation 7. Develop and implement a program to define equipment needs early and to advise suppliers of upcoming requirements in advance so that equipment may be designed rather than modified to the need.

PROCUREMENT

Successful procurement hinges on timely and very close cooperation among the Contracting Officer, program managers, key technical specialists, logistic support personnel, and other key members of the procurement team.

The Task Force explored major problems associated with the procurement of ETE, ETE parts, and ETE repair and calibration services. As a result of this exploration, the Task Force closely examined the issues and formulated 9 recommendations concerning: Procurement simplification. Cost of ownership. Increased use of bid samples. Prospective contractor qualifications. Proliferation control. Warranties. Enforcement of contract terms. Assignment of claims.

Procurement Simplification

Problem. DOD procedures for buying off-the-shelf electronic test equipment (OTS ETE) are unnecessarily cumbersome. Administrative costs are high and the leadtime for acquisition is long. Maximum logical use is not being made of simplified buying methods such as multiple-award Federal Supply Schedules.

Recommendation 8. Encourage maximum use of the multiple-award Federal Supply Schedule program, in coordination with the General Services Administration, as a cost-effective and time-saving means of purchasing off-the-shelf electronic test equipment.

Minority Recommendation 8. Encourage, in coordination with the General Services Administration, the increased use of the multiple-award Federal Supply Schedule program as the primary and preferred method of purchasing off-the-shelf electronic test

equipment up to the maximum order limit (MOL) due to its improved cost effectiveness, minimum acquisition time, annual fixed pricing, and control of vendor selection which assures multiplicity of suppliers as well as limiting proliferation of equipment.

Cost of Ownership

Problem. ASPR 3-801.1 states that: "It is the policy of the Department of Defense to procure supplies and services from responsible sources at fair and reasonable prices calculated to result in the lowest ultimate overall cost to the Government."

Although DOD's policy is to award contracts at fair and reasonable prices calculated to result in the lowest overall cost to the Government, contracts for off-the-shelf electronic test equipment (OTS ETE) are usually awarded to the low bidder or offeror, since cost of ownership factors are seldom considered adequately in the procurement.

Recommendation 9. Provide improved guidelines for evaluating ownership cost factors in addition to bid price in the award of contracts for electronic test equipment.

Increased Use of Bid Samples

Problem. The benefits of using bid samples and other product qualification methods are not being fully realized.

Recommendation 10. Revise procurement directives to expand and make more flexible the use of bid samples.

Prospective Contractor Qualifications

Problem. Procurement directives impose constraints on judging contractor qualifications and responsibility prior to award. As a result, awards are sometimes made to equipment contractors who are unable to provide parts and service support after the equipment is put into use.

Recommendation 11. Revise procurement directives to more specifically authorize consideration of contractor's current ability to provide parts and service support throughout the economic life of equipment in addition to consideration of contractor's current production ability and prior performance.

Proliferation Control

Problem. Proliferation of different makes and models of electronic test equipment (ETE) in the defense inventory results

in high operating and logistic costs. Proliferation is increased by awards to marginal suppliers and by retention of obsolete inventory.

Recommendation 12. Establish DOD guidelines for standardization that provide for maximum use of off-the-shelf electronic test equipment while taking into account operating and logistic costs, obsolescence, competition, and the advancement of test equipment technology.

Recommendation 13. Recognize that Preferred Item Lists (PILs) are a method of limiting inventory and related support requirements for electronic test equipment. PILs are valuable management tools but should not be so restrictive as to limit purchase to a single manufacturer's piece of equipment when similar off-the-shelf equipment is available.

Minority Recommendation 13. Preferred Items Lists (such as MIL-STD-1364) are the preferred method to catalog specifications and requirements for representative electronic equipment including off-the-shelf electronic test equipment. These PILs are only to indicate salient or general limited specifications. They must not define a single manufacturer's piece of equipment unless it is controlled by a MIL-SPEC and Government-owned drawings are available to make it producible by more than one manufacturer.

Warranties

Problem. Internal administrative procedures make it difficult for Government agencies to take advantage of warranties. The complexity of procedures related to shipping, property accountability, identifying responsibility for malfunctions, and other problems render many warranties of little value to the Government.

The problems become more complex for large, central purchases. In such cases, warranties tend to lapse before the items are placed in use.

Recommendation 14. Establish procedures to assure that the Government receives the fullest possible benefit from commercial warranties.

Enforcement of Contract Terms

Problem. Contract remedies for delayed deliveries, default, and unsatisfactory products are sometimes not adequately being enforced in the procurement of off-the-shelf electronic test equipment (OTS ETE).

Recommendation 15. Reaffirm by DOD directive the policy of vigorous contract administration and enforcement of off-the-shelf electronic test equipment contract terms to establish a reputation in DOD of requiring compliance as generally being in the best interest of the Government.

Assignment of Claims

Problem. Many manufacturers of OTS ETE have difficulty in arranging to have assignment of claims (receivables on a contract) acted on expeditiously by Contracting Officers. As a result of what appears to be slow administrative action, these assignments take a great deal of time to accomplish, and this delay results in cash flow and financing problems, especially for small business.

Recommendation 16. Modify ASPR 7-103.8 and FPR 1-30.703 to simplify the assignment of receivables on contracts of up to \$250,000 at the discretion of the contractor and under the terms of the Uniform Commercial Code.

LOGISTICS

As addressed in this report, logistics encompasses the management of ETE inventory; provisioning, cataloging, and distribution of repair parts; and repair and calibration services provided both by contract and by Government personnel, including the manuals which provide instruction for repair and calibration.

The Task Force explored the full range of problems associated with the logistic support of ETE. As a result of this exploration, the Task Force closely examined the issues and formulated 7 recommendations concerning: More extensive exploitation of commercial support resources. Consolidation of calibration and repair facilities. Replacement of older, logistically expensive ETE. Standardization of documentation requirements for provisioning data and manuals. Training.

Logistic Support

Problem. Current DOD logistic support systems often fail to take advantage of commercial resources that are available for the support of ETE. In many situations, the logistic support for ETE provided by DOD is more costly than the direct commercial support available to industry and Government. DOD policies and regulations encourage the optimum use of commercial sources for logistic support; however, these directives are not aggressively pursued.

Recommendation 17. Have the Military Services take greater advantage of commercial support systems for the supply of repair parts, repair and calibration services, and training to the extent they can effectively and economically meet military needs.

Recommendation 18. Authorize the Military Services to budget for, acquire, and hold in reserve at appropriate locations a carefully selected "pool" of electronic test equipment and items to replace equipment temporarily out of service.

Calibration and Repair Facilities

Problem. Each of the Military Services maintains a world-wide network of calibration and repair facilities (CRFs) to assure that such capability will be available with minimum delay and maximum effectiveness. Although the need to consolidate CRFs has been clearly recognized by the Military Services, progress has been very slow in increasing CRF productivity, in introducing new technology, and in reducing CRF costs.

Recommendation 19. Direct the Joint Logistic Commanders to place higher priority on efforts to:

(a) Survey the personnel utilization, equipment, operating costs, and facilities costs of all Service calibration and repair facilities.

(b) Identify calibration and repair facilities that can be advantageously consolidated or eliminated (either within a Service or among Services). Maximize cost savings by using the resources of the original manufacturers or of service contractors in either Government or commercial facilities as appropriate.

(c) Provide simplified procedures either through General Services Administration Federal Supply Schedules or by other means that will facilitate the use of support resources available from electronic test equipment manufacturers.

(d) Accelerate the effective application of emerging technology, such as automated calibration systems, to reduce requirements for skilled personnel. Consolidation and specialization of facilities would increase the economic feasibility of using such equipment.

Replacement of Older Electronic Test Equipment

Problem. The Military Services have had difficulty in providing cost-effective logistic support for older electronic test equipment (ETE). Since there is usually a lack of funds for its replacement, older ETE that is no longer cost-effective to maintain and use tends to remain in the active inventory.

Recommendation 20. Expand present procedures for systematically replacing older electronic test equipment based on cost of ownership, and provide recognition in the budgeting process to accomplish this. Clarify policy and develop more workable procedures for implementing ASPR 4-200 to facilitate the sale of older electronic test equipment and use of the proceeds for the purchase of new equipment.

Commercial Manuals

Problem. The requirements for acceptability of commercial manuals for off-the-shelf electronic test equipment (OTS ETE) are not sufficiently uniform among the Military Services to enable the manufacturer to produce a manual with confidence that it will be accepted by all Services. The Services do not fully recognize that most OTS ETE manuals have been well designed to service a wide variety of commercial customers.

Recommendation 21. Establish uniform tri-Service requirements to enable industry to produce commercial manuals that will be accepted by all Services without rewrite. Special requirements unique to one Military Service would be ordered in addition to the commercial manual.

Provisioning Data

Problem. Each of the Military Services takes a somewhat different approach to the provisioning of OTS ETE. These differences often entail duplication of effort by a manufacturer who sells identical ETE to more than one Service. Such duplication of effort increases the cost of provisioning to the Department of Defense.

Recommendation 22. Implement uniform tri-Service documentation for provisioning off-the-shelf electronic test equipment and modifications thereof, but omit documentation except in special circumstances where required to meet military needs.

Training

Problem. The rapidly advancing state-of-the-art requires constant updating of the skills needed to operate, maintain, and repair off-the-shelf electronic test equipment (OTS ETE). The serviceability of modern ETE will be seriously affected if military training in this dynamic field does not keep pace with technology.

Recommendation 23. Select and employ the most thorough and effective curricula and techniques, including those available from industry, for the training of user-technicians in the application and use of electronic test equipment and of instrument repairmen in the maintenance of such equipment.

MANAGEMENT

In the course of its studies and deliberations, the Task Force noted that: (1) The full impact of decisions concerning ETE tends to escape Service-wide management attention. Such devices are generally regarded as an obscure part of weapon system supply support. (2) Frequently, the recommendations of task groups and special study efforts are "filed and forgotten."

Based on its examination of these problems, the Task Force formulated 5 recommendations concerning: Acquisition management. Followup on Task Force recommendations.

Acquisition Management

Problem. The full impact of decisions concerning ETE tends to escape Service-wide management attention. This is particular true for weapon systems since ETE is generally regarded as an obscure part of weapon system supply support. As a result, such decisions tend to be made on an ad hoc program-by-program basis without formal, direct reference to interprogram experience, the Service's overall budget, and the posture of its ETE inventory. A sharper Service-wide focus on ETE would tend to improve the quality of program decisions related to the selection and acquisition of ETE.

There are significant differences in the overall cost to the Government of acquisition and use of ETE such as:

- When it must be built specially to meet the detailed requirements of a Military Specification.
- When OTS ETE can be used or modified to fulfill military performance requirements.
- When the requirement can be satisfied by the purchase of OTS ETE from a commercial supplier using prepriced contractual arrangements.

However, there are no generally recognized guidelines for judging the magnitude of these differences. In the absence of readily usable guidelines, major opportunities for saving are frequently overlooked when ETE is specified by the Military Services. Current guidelines revolve around "minimum" system maintenance

cost. They do not recognize the interfaces with other deployed systems/equipment or methods of acquisition.

Recommendation 24. Place both general-purpose and special-purpose electronic test equipment under a single manager in each Military Service.

Minority Recommendation 24. Place general-purpose electronic test equipment under a single ETE manager in each Military Service. The ETE manager shall also review and coordinate all special-purpose electronic test equipment acquisitions to maximize the use of off-the-shelf electronic test equipment.

Recommendation 25. Identify and consider significant administrative and other indirect cost differentials associated with the acquisition of electronic test equipment when: (a) it is built specially to conform with a Military Specification, (b) a commercial product can be used or modified to fulfill military requirements, and (c) an off-the-shelf product can be purchased using prepriced contractual arrangements to meet military needs.

Followup on Task Force Recommendations

Problem. In many cases, the recommendations of task groups and special study efforts are not implemented due to the lack of a program to assure understanding, late consideration by those affected, insufficient monitoring, and resistance to change among those affected.

Recommendation 26. Establish a program to monitor implementation of accepted Task Force recommendations. Designate a specific person in the Department of Defense to manage the program.

Recommendation 27. Assemble the Task Force periodically in 1976 to evaluate results being attained through implementation of its recommendations.

Recommendation 28. Provide for feedback from industry as one means of evaluating how effectively accepted recommendations are being implemented.

MAGNITUDE OF POTENTIAL SAVINGS

The Task Force estimates that savings on the order of \$80 million per year will result from prompt and orderly implementation of its recommendations. In large measure these savings can be achieved through greater use by DOD of privately developed, commercially available off-the-shelf electronic test equipment (OTS ETE). These potential savings are based on conservative estimates using the best available information.

- The Task Force recognizes the serious lack of an adequate cost accounting system and the lack of valid cost data. This inability to provide operational cost visibility can make it very difficult to identify specific savings that would result from implementing specific Task Force recommendations. Nonetheless, potential savings have been estimated, and the estimates are believed to be accurate.
- The Task Force also believes that although several of the recommendations may appear to increase costs as a result of changing current practices, there should be offsetting benefits. For example, Recommendation 24 proposes establishing a single manager in each Service for electronic test equipment. Long-range benefits in terms of improved acquisition management, logistic support, and facility resource utilization should more than offset any short-range cost increases. In addition, the single manager will provide a means for assuring optimum implementation of other accepted Task Force recommendations.
- The Task Force has also taken into account the probability that some recommendations will be delayed or not fully implemented for various reasons. Therefore, allowance has been made for this in the savings estimates.
- It should be noted that the potential savings are not all hardware-related but also include costs associated with such factors as people, facilities, transportation, handling, and warehousing. It, therefore, follows that several categories of funds and budget line items will be affected.

The potential savings have been related to the Task Force recommendations as follows:

<u>Recommendation</u>	<u>Estimated annual savings</u>
Reduced writing of specifications (Recommendations 3, 4, and 5)	\$10,500,000
Procurement simplification (Recommendation 8)	6,200,000
Increased use of bid samples (Recommendation 10)	15,000,000
Use of Army Preferred Item Lists (Recommendation 13)	17,500,00
Greater use of commercial warranties (Recommendation 14)	3,000,000
Direct use of commercial parts support (Recommendation 17)	7,000,000*
Reduced calibration and repair facilities costs (Recommendation 19)	8,500,000
Improved replacement procedures for older equipment (Recommendation 20)	9,000,000**
Greater use of commercial manuals (Recommendation 21)	1,200,000
Total estimated annual savings	\$77,900,000

*Averaged over the first 12 years.

**Averaged over the first 10 years. Annual savings reach \$30 million after 8 years.

REQUIREMENTS

The identification and statement of requirements is the first step in the process of acquiring electronic test equipment. Decisions made at this time often have a crucial impact on the eventual success or failure of an acquisition program.

The Task Force explored major problems associated with the identification and statement of requirements. As a result of this exploration, the Task Force closely examined the issues and eventually formulated 7 recommendations concerning: Performance goals for the support of major weapon systems. Communication of "lessons learned." Military specifications. Automatic test equipment. Early announcement of anticipated requirements.

Requirements

PERFORMANCE GOALS FOR THE SUPPORT OF MAJOR WEAPON SYSTEMS

PROBLEM

When a new major system is conceived and its mission defined, the initial performance goals often tend to be overambitious. In many cases, all these optimistic goals harden into firm commitments before the lifetime costs of ownership of the test equipment needed to achieve them are adequately taken into account.

Most of the electronic test equipment (ETE) acquired for the Military Services is selected by and procured through major system prime and subcontractors. In many cases, the Military Services, through their prime and subcontractors, are not taking full advantage of the time- and money-saving opportunities for using off-the-shelf (OTS) ETE.

SOLUTION

Recommendation 1. Strengthen major system review procedures to ensure that specific mission requirements are evaluated early and continuously in light of resulting logistic support costs of electronic subsystems and complementary requirements for electronic test equipment. Examine policies and procedures currently governing the acquisition practices in major system prime and subcontracting as they relate to the acquisition and logistic support of electronic test equipment. Modify these policies and procedures as necessary to promote, consistent with mission requirements, the cost-effective use of off-the-shelf and modified commercial electronic test equipment.

ANTICIPATED BENEFITS

Implementation of this recommendation would:

- Provide for better program decisions concerning performance goals, ensuring that all major downstream costs are considered early and often during development of a major system.
- Give greater visibility to the support costs entailed in attaining specific performance goals.
- Focus on possible opportunities for dollar savings resulting from use of OTS ETE and modified commercial ETE rather than ETE custom-built to conform with a Military Specification.

- Provide data useful in making timely tradeoff decisions.

BACKGROUND/DISCUSSION

ETE accounts for an ever greater share of the cost of major systems, and major systems account for a giant share of the entire defense budget. Yet, the full impact of ETE costs on a major system may not be anticipated until great sums have already been committed--or delays have been encountered--in the pursuit of special, nice-to-have, but nonessential features.

It is therefore crucial for the economic and operational success of a new system that the lifetime ownership costs of fulfilling all the initial goals be projected as early and as accurately as possible. This is the time to ask such questions as:

- Is it essential for the ETE to be able to function at a "bare" base anywhere in the world?
- Will custom-built ETE be called on to do something that OTS ETE or modified commercial ETE could not do?
- Is the outcome of the R&D needed for an achievement beyond the state-of-the-art a desired risk if the system must be delivered on time and within budget?
- Would OTS ETE: Perform the essential function? Advance delivery dates and, hence, operational readiness? Foster industrial preparedness for a national emergency?

ETE requirements for major systems now account for more than half of all ETE acquired by or for DOD. Almost all ETE for major systems is procured for DOD by major system prime and subcontractors.

The great costs, long delays, and built-in obsolescence that occur in writing Military Specifications and technical manuals and in providing quality assurance, provisioning, depot support, and in-house repair and calibration of custom-built ETE are discussed elsewhere in this report. The current extent and magnitude of these problems suggest that the Military Services are not using OTS ETE or modified commercial ETE to full advantage in support of major systems.

There is, therefore, a basis for reevaluating the extent to which prime contractors are obligated and encouraged to use OTS ETE and modified commercial ETE rather than ETE custom-built to Military Specifications or other special purchase descriptions.

IMPLEMENTATION

- The Office of the Secretary of Defense should direct each Military Service to strengthen its major system review procedures along the lines suggested in the foregoing recommendation and discussion.
- The Department of Defense should review drafts of the strengthened procedures developed by each Service to ensure that DOD's overall goals are being met and that the most practical aspects of each draft are combined in revised directives governing the review of ETE requirements for major systems.

Requirements

COMMUNICATION OF "LESSONS LEARNED"

PROBLEM

Any attempt to discover the root causes of logistic failures, delays, and cost overruns that have been associated with major Government programs is likely to reveal that "lessons learned" (both successes and failures) are not being passed along systematically in a timely and effective manner. This shortcoming is particularly evident in the acquisition of major weapon systems where--for such reasons as security classification, proprietary interests, and the natural disinclination to discuss mistakes--there has been a failure to profit from experience.

SOLUTION

Recommendation 2. Formalize current procedures to ensure the timely inter-Service and intra-Service exchange of "lessons learned" in the selection, acquisition, logistic support, and use of electronic test equipment required for major weapon systems.

ANTICIPATED BENEFITS

- Decisions on electronic test equipment (ETE) that take into account the experience gained on earlier and current programs.
- Minimal duplication of design and development efforts through optimal use of off-the-shelf (OTS) and modified commercial ETE.
- Achievement of time and dollar savings by avoiding pitfalls encountered in other programs.

BACKGROUND/DISCUSSION

The availability and performance of a major system depends in increasingly large measure on the reliability and effectiveness of supporting ETE. ETE also accounts for a substantial share and has significant leverage on the total lifetime cost of the system. Yet there is ample evidence that ETE decisions are often made without adequate consideration of the successes and failures experienced in the selection, acquisition, and logistic support of ETE for other major systems.

One conclusion that can be derived from recent studies is that the logistic support problems of major systems, in which ETE is a significant part, are recurring in a number of new programs. In the absence of a routine, formal means for interchange of ETE experiences among System Program Offices (SPOs), it is likely that such problems will continue to recur.

IMPLEMENTATION

- The Department of Defense should develop formal procedures that require timely inter-Service and intra-Service exchange among program officers of "lessons learned" in the selection, acquisition, logistic support, and use of ETE. The proposed single manager (see Recommendation 24) for ETE in each of the Military Services would be a key element in the exchange network.

Requirements

MILITARY SPECIFICATIONS

PROBLEM

Most Military Specifications for electronic test equipment (ETE) require ETE of special design and manufacture. The use of Military Specifications is usually warranted when ETE must be custom-built to fulfill requirements that are unique to the Department of Defense. However, the Military Services often use Military Specifications calling for ETE of special design when modified commercial or off-the-shelf (OTS) ETE would perform the required function.

The use of current Military Specifications tends to complicate and increase the cost of contract administration, delay delivery, foster the production of ETE of obsolescent design, sharply increase the costs of logistic support, and create operational, maintenance, and calibration problems. Moreover, many obsolete Military Specifications remain in the system.

SOLUTION

Recommendation 3. Implement a procedure requiring justification for development of a new Military Specification where off-the-shelf electronic test equipment can meet the requirement. Augment resources as necessary to eliminate obsolete test equipment specifications in accordance with established procedures.

Recommendation 4. Raise the priority of the ongoing task of revising general Military Specification MIL-T-28800 and ensure that it facilitates the procurement of commercial off-the-shelf test equipment.

Recommendation 5. Reduce overapplication of specification requirements such as: Environmental requirements. Military parts, materials, and processes. Detailed specifications for specific categories of electronic test equipment (for example, MIL-O-24311--Oscilloscope). Qualified Products Lists (QPLs). Purchase descriptions, when they are redundant. Life-Cycle Costing (LCC), when not applicable. Total Cost Effectiveness (TCE), when not applicable. First Article Testing, when inappropriate. Excessive drawing and documentation requirements.

ANTICIPATED BENEFITS

Procurement of OTS ETE without imposition of modifications or design changes will provide:

- Reduced acquisition costs estimated at \$10.5 million per year.
- Shorter procurement leadtimes.
- Potential for cost-effective use of manufacturer's repair and calibration services.
- Increased insurance against the technical and cost problems often associated with dependence on a single source for specially designed equipment and parts.

BACKGROUND/DISCUSSION

Military Specifications have some advantages, but many disadvantages. They are essential when the Military Services have longstanding, recurring needs for large numbers of items designed specially for military use. They are useful for items of stable, nonproprietary, and essentially equal design that are generally offered to the public by many suppliers in various grades and sizes. In such cases, Military Specifications can be used to foster competition, achieve standardization, and simplify the award of contracts.

Among the disadvantages of Military Specifications are that they:

- Are very costly to develop and maintain. This very large overhead expense is not always taken into account in calculating the total cost to the Government of the specified item.
- Usually take a long time to prepare. This tends to delay the solicitation and, hence, delivery of new items.
- Often require each successful contractor to acquire special tooling and to interrupt regular production of commercial products.
- Increase the costs of contract administration, particularly those related to quality assurance.
- Refer to a multiplicity of other specifications and standards--many of them obsolete--from numerous sources, and thus, for many manufacturers, tend to inhibit competition because of the cost of responding to the Government solicitation.

- Freeze the design, and therefore, fail to take advantage of technological advancements embodied in the most current, commercially available counterpart products that perform the same basic function.
- Tend to specify special features that are not essential for fulfilling the military need.
- Usually require a complex, expensive, and often slow-moving logistic support system.

Overapplication of specifications was one of the main problems cited by Dr. Joseph Shea in his presentation to Deputy Secretary of Defense Clements on the findings of the Defense Science Board Task Force on Specifications and Standards. In a subsequent memorandum to the Secretaries of the Military Departments (August 4, 1975), Mr. Clements noted that overapplication of specifications and standards is a major cause of cost escalation.

The Military Services buy some products for which they are the only users and some for which the Department of Defense is only one of many users. Today, commercial users account for the largest share of the total market for ETE, and most commercial users prefer to buy OTS ETE. The commercial users generally order from commercial catalogs, rely on the manufacturer's regular program for quality assurance, take advantage of standard warranties, and obtain parts and repair and calibration services directly from the extensive network of ETE support centers operated by manufacturers and other commercial sources.

Most of the OTS ETE available to commercial users is readily available to the Military Services through multiple-award Federal Supply Schedules negotiated annually by the General Services Administration. If OTS ETE must be modified to fulfill essential military needs, the basic commercial ETE can be ordered by means of the highly simplified Federal Supply Schedule procedures, and the modification can be ordered on a supplementary procurement document. However, there is a maximum order limitation (MOL) on Federal Supply Schedules. The MOL for ETE has recently been raised from \$50,000 to \$250,000.

When a military need can be met by OTS ETE or modified commercial ETE, Military Specifications should not be used unless the purchase exceeds the MOL of the Federal Supply Schedule or the potential benefits of a formally solicited procurement would clearly offset the cost, time, and other disadvantages associated with the use of Military Specifications.

The Military Services conduct an annual review of ETE specifications in order to purge those that have become obsolete.

Nevertheless, many clearly obsolete specifications remain in the system. Since a special effort is apparently needed to clear away all of the obsolete specifications, several industry members of the Task Force have volunteered to assist the Military Services in the next annual review of ETE specifications. This would provide the Services an opportunity to receive an industry input and to augment at little or no cost the resources needed to accomplish this important task.

Many Military Specifications in current use are contradictory in that they call for conflicting requirements by reference to other specifications and standards of various origin and date. Many other Military Specifications in current use are excessively oriented to "telling how" rather than simply specifying performance requirements. These Military Specifications should also be reviewed and be revised or amended.

MIL-T-28800 is a tri-Service general Military Specification for ETE. The MIL-T-28800A edition of this complex document is currently in force. However, a revised edition--MIL-T-28800B--is scheduled for publication in Spring 1976. The Naval Electronic Systems Command (NAVELEX), serving as the lead agency for DOD, is coordinating the revision with the Military Services and with industry.

An important purpose of MIL-T-28800 is to facilitate the purchase of OTS ETE or--if necessary--modified commercial ETE. While it is possible to use MIL-T-28800A or MIL-T-28800B (draft of April 4, 1975) to order OTS ETE, it is extremely difficult to do so. The main emphasis of both documents is on Type I ETE (equipment designed specifically for military use). In neither document is there any reference to the availability of OTS ETE through multiple-award Federal Supply Schedules. The ordering procedures are much more complex than those required when Federal Supply Schedules are used. Moreover, a multitude of special options are so prominently presented that they may often be specified without adequate consideration of their cost or essentiality.

Selected provisions of MIL-T-28800 can be used as the basis of solicitation for procurements that exceed the MOL of the Federal Supply Schedule. However, it is difficult to select the provisions that would provide for the acquisition of OTS ETE currently available so as to preclude expensive modification of such equipment solely to meet the requirements of a solicitation.

When considering the modification of OTS ETE, the Military Services often fail to take into account the high cost, long delays, and reduced reliability that often result from even "minor" modification of such equipment. For example, one industry

representative noted that it is becoming commonplace for the Services to specify modification of instrument cases for battery access, location of controls and fuses, etc.; this forces the manufacturer to modify something on which he has spent thousands of dollars for design and tooling. Such modifications tend to be very costly unless the procurement is large enough to warrant interruption of a production line. If OTS ETE is already packaged, even a requirement to fasten a metal tag to the ETE requires the supplier to remove it from the container, figure out where and how to attach it, and then repackage. Such costs must be recognized when specifying what appear to be minor modifications.

The Task Force conservatively estimates that a saving of \$10.5 million per year will result from implementation of Recommendations 3, 4, and 5. (This saving is in addition to the saving of \$6.2 million per year cited in the discussion of Recommendation 8.)

IMPLEMENTATION

- Prior to the procurement of ETE, it should be determined if OTS ETE is available that will meet the military need.
- If OTS ETE is available, adequate consideration must be given to its use and availability through multiple-award Federal Supply Schedules.
- Industry should be encouraged to develop uniform formats for commercial specification characteristics or purchase descriptions to simplify procurement of the OTS ETE.

Requirements

AUTOMATIC TEST EQUIPMENT

PROBLEMS

Since the 1950's, advances in electronic technology have given rise to a need for faster, more detailed tests than can be accomplished with manual test equipment. In response to this need, the Government and industry have developed a diverse array of automatic test equipment (ATE). This rapid growth of ATE in itself has created new technical and management problems affecting maintainability, testability concepts, compatibility of prime system electronic design with test languages, and operator training. ATE requires a high level of use to justify its high initial cost, and its use tends to reduce the workloads of many manual, small-volume repair and calibration facilities.

SOLUTION

Recommendation 6. Broaden and intensify DOD/Industry efforts to provide basic guidelines for the design, development, acquisition, use, and logistic support of automatic test equipment (ATE) so as to foster the compatibility, versatility, and optimum usability of such equipment for military and commercial applications. Promote the design of primary systems and subsystems so as to facilitate their testability with general-purpose automatic test equipment. Foster the selection and use of a common software test language. Require that the purchase of ATE be justified on the basis of adequate study of its economic and technical effectiveness.

ANTICIPATED BENEFITS

Implementation of this recommendation would help to:

- Reduce hardware and software costs associated with logistic support of major systems.
- Control the proliferation of incompatible hardware and software.
- Improve the operational readiness of major systems through the rapid detection, isolation, and correction of faults.

BACKGROUND/DISCUSSION

There are in motion a number of significant DOD/Industry actions seeking to solve problems associated with the acquisition and use of ATE. A number of landmark standards and guidelines have already evolved, and others are being formulated to harness more effectively the development and use of ATE and related software.

There is an ongoing dialogue between ATE users and developers in the Military Services and such industry groups as the National Security Industrial Association (NSIA), Electronic Industries Association (EIA), Aerospace Industries Association (AIA), and ARINC's Airlines Electronics Engineering Committee (AEEC). For example, an ad hoc committee is currently addressing specific Navy concerns in: ATE programming languages. Automated test programs. ATE interface technology. Operator education and training. Advanced ATE technology.

Such DOD/Industry groups are properly focusing on complex problems unique to ATE and are attempting to provide specific guidance to users and suppliers. However, one concern that is also of interest to OTS ETE developers is that of fostering the design of prime equipment for better testability and to minimize the need for unique test access and electromechanical interfaces.

Within DOD, the Army is serving as lead agency for the Defense ATE Language Standardization Group (DATELS). A number of other groups have addressed the problem presented by the current multiplicity of test languages. The NSIA Technical Group on Automatic Test Equipment Language Standardization recently recommended that ARINC ATLAS (Specification 416) be adopted as the test language standard and that DOD, ARINC, and industry support the maintenance and widespread international use of ARINC ATLAS. DATELS is weighing this recommendation and is entertaining other alternatives.

IMPLEMENTATION

The Office of the Assistant Secretary of Defense (I&L) should invite all industry groups and Government agencies that have a major interest in ATE to join current efforts to assist and jointly resolve such issues as:

- Language standardization.
- Interface techniques.
- Design for testability.
- Cost/benefit analysis techniques for ATE.

Requirements

EARLY ANNOUNCEMENT OF ANTICIPATED REQUIREMENTS

PROBLEM

The response of electronic test equipment (ETE) manufacturers to the needs of the marketplace is a function of direct solicitation of potential customers and participation in various business forums. The ETE industry also studies current technical developments and endeavors to assess future electronic test needs of ongoing projects. However, the needs of the Military Services are not being communicated to the ETE industry as effectively as those of potential commercial customers.

SOLUTION

Recommendation 7. Develop and implement a program to define equipment needs early and to advise suppliers of upcoming requirements in advance so that equipment may be designed rather than modified to the need.

ANTICIPATED BENEFITS

Implementation of this recommendation will help to:

- Provide an orderly, dependable means for the Military Services to alert industry to their future needs for new ETE technology.
- Reduce the need for modifying off-the-shelf (OTS) ETE.
- Shorten leadtime for procurement.
- Increase opportunities for cost savings through greater use of OTS ETE.

BACKGROUND/DISCUSSION

With declining purchasing power a continuing problem, it becomes ever more important to ensure that industry is advised of Service-anticipated needs in order to facilitate the design of OTS ETE that meets both military and commercial requirements. The Services already use a number of methods to inform industry of their future needs: for example, the Army announces its anticipated equipment needs for the forthcoming year in the Commerce Business Daily.

IMPLEMENTATION

- The Military Services should maximize the use of currently available means, such as the Commerce Business Daily and technical periodicals to announce their anticipated needs for ETE to industry.
- The Office of the Secretary of Defense (I&L) and the Services should explore other feasible means for communicating upcoming ETE requirements to industry.

PROCUREMENT

Successful procurement hinges on timely and very close cooperation among the Contracting Officer, program managers, key technical specialists, logistic support personnel, and other key members of the procurement team.

The Task Force explored major problems associated with the procurement of electronic test equipment, ETE parts, and ETE repair and calibration services. As a result of this exploration, the Task Force closely examined the issues and formulated 9 recommendations concerning: Procurement simplification. Cost of ownership. Increased use of bid samples. Prospective contractor qualifications. Proliferation control. Warranties. Enforcement of contract terms. Assignment of claims.

Procurement

PROCUREMENT SIMPLIFICATION

PROBLEM

DOD procedures for buying off-the-shelf electronic test equipment (OTS ETE) are unnecessarily cumbersome. Administrative costs are high and the leadtime for acquisition is long. Maximum logical use is not being made of simplified buying methods such as multiple-award Federal Supply Schedules.

SOLUTION

Recommendation 8*. Encourage maximum use of the multiple-award Federal Supply Schedule program, in coordination with the General Services Administration, as a cost-effective and time-saving means of purchasing off-the-shelf electronic test equipment.

ANTICIPATED BENEFITS

Implementation of this recommendation will help to:

- Realize administrative and other indirect savings of an estimated \$6.2 million per year by reducing the costs of writing specifications, purchasing, and inspection. These savings would result from buying ETE through Federal Supply Schedules rather than by other methods, including those based on the use of Military Specifications.
- Increase the purchase of ETE that is assumed to have met successfully the competitive price and reliability demands of the marketplace.
- Provide more responsive delivery when buying small quantities of ETE for direct delivery to using activities.
- Strengthen a program that can be used readily, when appropriate, not only during local emergencies but at all times.
- Provide greater opportunity for small business to increase its share of the OTS ETE market.

*See minority position following the discussion on this recommendation.

- Obtain the lowest prices for OTS ETE except possibly for very large buys.

BACKGROUND/DISCUSSION

Under present procedures, requirements for ETE are usually aggregated for purchase by a central office. Design or performance specifications are written, an invitation for bid or request for proposal is developed and issued, offers are received and evaluated, and a contract is awarded. The process often involves use of source selection boards for the evaluation of proposals. In-plant inspection and acceptance may also be required to assure compliance with specifications. The cycle takes from 8 months to 2 years from identification of need to delivery.

These procedures have been developed over the years with the aim of increasing competition and, hence, reducing the price paid for the end item. However, the costs to Government and industry of carrying out this process as opposed to the potential benefits of making smaller purchases in the commercial market are not usually considered.

Each year, the General Services Administration negotiates contracts called Federal Supply Schedules with most ETE manufacturers. These schedules have a maximum order limitation (MOL), which was recently raised from \$50,000 to \$250,000.

The schedules were developed originally to help field activities in buying small quantities of equipment. Central buying offices seldom use the schedules on the premise that better prices can be obtained by aggregating requirements and soliciting suppliers to compete for large orders. However, one Task Force member, a large manufacturer, noted that, on the average for equivalent products, the annual discounts negotiated by GSA for the schedules result in prices just as favorable as those obtained by DOD on other purchases because large purchases can cause costly interruptions in the production process. Occasional large orders do result in substantial discounts, but on the whole, the prices obtained on small buys through the schedules are not significantly different.

An initial provisioning of repair parts for special ETE is usually acquired along with the purchase of the equipment. ETE users obtain their subsequent requirements for parts through the DOD supply system or--in emergencies--directly from manufacturers and suppliers.

Some ETE users visited by the Task Force noted that critical needs for repair parts are often encountered that can best be filled by direct delivery from a manufacturer or supplier, but the local purchase procedures involved are cumbersome. Since

direct commercial support is generally the best way to obtain repair parts to overcome a local emergency, a simplified procedure should be developed to facilitate direct delivery as the primary means of support for OTS ETE at all times.

The Federal Supply Schedules, or a similar indefinite delivery contract system, appear to provide an excellent basis for such a simplified procedure. For example, if the Federal Supply Schedules for ETE included prepriced parts lists, using activities would have a simplified means for obtaining direct delivery of repair parts. This would save time and avoid the costs now incurred for provisioning, cataloging, and depot stocking of parts. An estimate of the potential savings is provided in the discussion of Recommendation 17.

Present procedures for ordering calibration and repair services from the manufacturer are also administratively cumbersome. The complexity of funding and procurement authority usually delay the return of ETE to the manufacturer and its subsequent return to the user. These problems are closely related to the difficulties of obtaining repairs under warranty (which are addressed separately in this report).

However, two Task Force members note that their companies have established service credit accounts with GSA consisting of 2% of all sales against the Federal Supply Schedules. This account is used as a simplified method to finance out-of-warranty services as requested by Government agencies. Procurement authority is not required, and agency needs are filled on a first-come, first-served basis. Thus, by taking advantage of the service credit accounts, a using activity can obtain needed repairs directly from a manufacturer in a short time with a minimum of administrative cost. Widespread use of such arrangements would result in major savings of time and money.

To make the Federal Supply Schedules even more useful to the Military Services, they should provide for maintenance manuals as separately priced items, for negotiation of minor modifications on equipment orders, and for overseas deliveries. These and other improvements in the Federal Supply Schedules can easily be made by coordination between DOD and GSA. This method of purchase appears to be the simplest, quickest, and probably cheapest method of ordering OTS ETE parts and repair and calibration services directly from suppliers. The current MOL of \$250,000 is more than adequate for local requirements and will also satisfy many central requirements.

The differences in the costs of using Federal Supply Schedules to buy OTS ETE compared with those of using other purchase methods, including those based on the use of Military

Specifications, is not currently known. However, it is estimated that this difference would average 7% of the purchase price.*

The Task Force estimates that of total DOD purchases of ETE in fiscal 1975, an additional \$88 million worth of ETE could have been acquired to better advantage through Federal Supply Schedules with a resulting saving on the order of \$6.2 million for the year.

Use of Federal Supply Schedules as the primary method for buying OTS ETE would result in other indirect benefits. By using a number of competitive suppliers, a broad industrial base is assured. Greater use of the schedules in buying equipment, parts, and services would strengthen the commercial distribution system as a major asset for use in national emergencies as well as at all other times. Since many repair parts would not have to be provisioned and cataloged, the number of items in the stock catalog would be reduced, making the catalog more effective for the support of equipment that must be specially designed for use by the Military Services.

To maintain the competitive integrity of the multiple-award Federal Supply Schedules without interfering with the convenience of these schedules, it is suggested that guidelines be provided to DOD agencies using these schedules which will ensure that the awards are publicized. Necessarily this will have to have some dollar threshold, for example, above \$25,000.

Consideration was given by the Task Force to developing an indefinite delivery contract program within DOD similar to the Federal Supply Schedule program. This concept was rejected on the ground that duplication of open-end contracts within the Federal Government (that is, by both DOD and GSA) could not be justified. A better alternative would be to invoke the delegation of authority (Section 205 (d)) and delegation of functions (Section 205 (e)) of the Federal Property and Administrative Services Act of 1949, as amended, if DOD, as the major user, felt that it must have primary responsibility for the Federal Supply Schedules on OTS ETE.

Precedent has been established for such a delegation on the basis of predominant use. For example, Federal Supply Schedules

*The Commission on Government Procurement estimated the cost of the Federal Supply Schedule program at 0.79% of the purchase price and direct delivery programs of the Defense Construction and Defense General Supply Centers at 7.43% and 8.44% respectively. Report of the Commission on Government Procurement, Vol. 3, pages 71, 95, and 96.

for drugs are now negotiated by the Veterans Administration (VA) under authority delegated to the VA by the Administrator of the General Services Administration; these schedules are used by the entire Federal Government.

IMPLEMENTATION

- Designate the Defense Supply Agency as the focal point for DOD liaison with GSA toward improvement of Federal Supply Schedules so as to better satisfy DOD requirements.
- Issue a DOD directive and revise ASPR if necessary to establish multiple-award Federal Supply Schedules as a primary method of purchasing OTS ETE whenever other methods of purchase are less cost-effective.
- Revise ASPR 1-1005.1, Synopsis of Contract Awards, to specify that orders against Federal Supply Schedules exceeding \$25,000 be published in the Commerce Business Daily.
- Give consideration to requesting that authority be delegated to DOD under Sections 205 (d) and (e) of the Federal Property and Administrative Services Act of 1949 for negotiation of Federal Supply Schedules for OTS ETE for the entire Federal Government.

MINORITY POSITION ON RECOMMENDATION 8

The following position was taken by Task Force member Fred Katzmann:

Recommendation 8, as finally approved by the majority, has weakened the forceful intent discussed in committee to actively encourage the use of the GSA Federal Supply Schedule program, which is the only positive and cost-effective method of purchasing OTS ETE.

The following strengthened recommendation is, therefore, proposed:

Minority Recommendation 8. Encourage, in coordination with the General Services Administration, the increased use of the multiple-award Federal Supply Schedule program as the primary and preferred method of purchasing off-the-shelf electronic test equipment up to the maximum order limit (MOL) due to its improved cost effectiveness, minimum acquisition time, annual fixed pricing, and control of vendor selection which assures multiplicity of suppliers as well as limiting proliferation of equipment.

BACKGROUND/DISCUSSION OF MINORITY POSITION

Although the multiple-award Federal Supply Schedule program is clearly the best way to buy OTS ETE, there is some danger that the system may be abused. Unlike industry, Government has a responsibility to purchase in an evenhanded, highly visible manner. The MOL on Federal Supply Schedules for ETE is now \$250,000. This means that purchases for as much as a quarter million dollars can now be made in a routine manner without notice to the public. DOD directives should mandate that notice of all orders against Federal Supply Schedules that exceed \$25,000 be published in the Commerce Business Daily. This would provide the same degree of visibility currently required by ASPR 1-1005.1 for open-market awards.

In negotiating Federal Supply Schedule contracts, GSA attempts to obtain the best ("benchmark") discount offered by any supplier from all suppliers of items in the same category. However, it does not always succeed and does not require identical discounts for similar products purchased in equal quantities. As a result, the degree of competition achieved is sometimes questionable. Abuse of this system could work to the disadvantage of small business firms. Therefore, it is recommended that DOD directives require that all orders for 1 to 5 units, for which there is more than one supplier, be 100% set-aside for small business.

Procurement

COST OF OWNERSHIP

PROBLEM

ASPR 3-801.1 states that: "It is the policy of the Department of Defense to procure supplies and services from responsible sources at fair and reasonable prices calculated to result in the lowest overall ultimate cost to the Government."

Although DOD's policy is to award contracts at fair and reasonable prices calculated to result in the lowest overall cost to the Government, contracts for off-the-shelf electronic test equipment (OTS ETE) are usually awarded to the low bidder or offeror, since cost of ownership factors are seldom considered adequately in the procurement.

SOLUTION

Recommendation 9. Provide improved guidelines for evaluating ownership cost factors in addition to bid price in the award of contracts for electronic test equipment.

ANTICIPATED BENEFITS

- Contracting Officers would have uniform guidance and assistance in evaluating proposals and selecting OTS ETE contractors.
- Fewer unsuitable products would be purchased.
- Logistic support costs would be reduced.

BACKGROUND/DISCUSSION

Title 10 of the United States Code, Section 2305 (c), states that: "Award shall be made ... to the responsible bidder whose bid ... will be most advantageous to the United States, price and other factors considered."^{*}

It has always been the intent of the law and its implementation in ASPR that factors such as cost of ownership should be considered by the Government in the award of contracts. However, the ASPR does not address the issue of "other factors" nor provide guidelines for their use. Consequently, Contracting Officers are

^{*}Emphasis added.

inhibited from making award to other than the lowest price offeror. But there are exceptions to this general practice; for large purchases, the agency tends to use life-cycle costing procedures or to convene source selection boards.

Life-cycle costing is authorized by ASPR 1-335. The problem with this concept as now established is the high cost of verifying and quantifying ownership costs. As a result, this method is only cost-effective in making large purchases. In using formal advertising procedures, the Contracting Officer has less discretion in awarding a contract than in competitive negotiation. If cost of ownership elements are spelled out in the invitation for bid, they can be used to determine the award if they are carefully stated and the formula for their use is rigidly followed.

While the life-cycle costing techniques practiced by industry are desirable, they cannot be used to full advantage in DOD until DOD develops an adequate cost accounting system as a basis for their application.

In large negotiated purchases, source selection boards can be used to evaluate cost of ownership as a major factor in making awards. However, since the establishment and use of such boards are extremely expensive, they should be convened only for very large purchases.

The process followed by source selection boards to achieve the basic objectives could easily be applied to lower dollar purchases by less formal technical evaluation panels. Such panels are often used when contracts for services are involved. Although technical panels can function at less expense than source selection boards, ASPR does not provide guidelines for their use.

ASPR 5-106 provides for purchases of other than the lowest priced item on multiple-award Federal Supply Schedules when the basis for the selection is justified by the ordering activity and made a part of the contract file. If adequately justified, cost of ownership can be considered in making a selection. However, ASPR does not provide guidelines for determining costs of ownership.

IMPLEMENTATION

- Devise and disseminate approved methods for determining cost of ownership, and provide guidelines for their application in procurements based on negotiation (ASPR 3-801) and on the use of multiple-award Federal Supply Schedules (ASPR 5-106).

Procurement

INCREASED USE OF BID SAMPLES

PROBLEM

The benefits of using bid samples and other product qualification methods are not being fully realized.

SOLUTION

Recommendation 10. Revise procurement directives to expand and make more flexible the use of bid samples.

ANTICIPATED BENEFITS

- Product acceptability for the intended use can be assured prior to contract award.
- Application of the "fly before buy" concept reduces the risk of system failure, schedule slippage, and cost overruns.
- Preaward testing and evaluation usually cost less than postaward evaluation by such means as first article testing, in-plant quality assurance, or military field use.
- Marginal producers will be discouraged or disqualified.
- Greater use of bid samples would save money. The Task Force estimates that costs of \$15 million per year would be saved by avoiding the costs, major system program delays, late deliveries, and other disadvantages that often arise when product acceptability cannot be demonstrated prior to contract award.

BACKGROUND/DISCUSSION

One major problem in buying electronic test equipment (ETE) is that of ensuring that the item being offered by a prospective contractor will meet the needs of the user. To determine prior to contract award that the low bidder can actually produce the required item, Contracting Officers have used such methods as:

- Bid sample method
- Brand Name or Equal method
- Data with Bid Method

- Qualified Products List method
- Qualified Source List method.

Several influences, stemming mainly from the Armed Services Procurement Regulations (ASPR) and the General Accounting Office (GAO), have severely inhibited the use of these methods. There is some fear that such methods may limit competition. Despite such fears, reliability, timely delivery, and cost savings usually result when competition is limited to sources that regularly produce the required item or a closely similar one.

Each of the methods listed has certain advantages and disadvantages, but the method that requires the submission of bid samples is the one that has been most successful.

The bid sample method assures that the item being procured has already been produced and will successfully meet the requirement. Optimum competition can be obtained since marginal producers will not be able to furnish an acceptable sample. Of all the product qualification methods, the bid sample method has worked best in the past, and it can be accomplished at minimum cost if existing test facilities are used. DOD should authorize and promote greater use of this method and provide clear guidelines for its use.

The Brand Name or Equal (BNOE) method promotes competition, rules out marginal producers, and has been found acceptable to GAO. However, use of the BNOE method is not without problems. If possible, more than one brand should be specified to avoid the implication that only one company's product is acceptable. The fact that a particular brand has been cited as a standard often invites protests to GAO. Another drawback to the BNOE method is that the "or equal" designation can lead to proliferation with associated increases in lifetime costs.

The "Data with Bid" method is to contract for an item based on a performance specification that sets forth required characteristics. Each proposal is for an item the offeror has already produced and sold on the commercial market, and the offer is accompanied by data, photographs, and schematics to show that the item meets all essential requirements. This method is generally not as effective as the bid sample method because bidders sometimes do not submit adequate data or the delivered product does not measure up to the data.

The Qualified Products List (QPL) method has also been used, but many firms believe that it limits competition. This method is usually costly and time-consuming. As a result, the Government often winds up buying outdated equipment because of the time it takes to qualify the products of two or more firms.

The Qualified Source List (QSL) method has not been fully pursued but it has a potential for identifying reliable sources. It would require a procedure somewhat similar to the QPL method. Here, companies that have produced equipment that has successfully met Government requirements and standards in selected categories could be qualified in advance to bid on DOD procurements within those categories. However, it would be prudent for any agency that intends to use this method to have its procedures approved by GAO before putting them into practice.

IMPLEMENTATION

- Emphasize by ASPR that bid samples and other specific qualification methods can and should be used to ensure product acceptability.
- Establish a tri-Service procedure whereby results of bid sample evaluations made by one Service are provided to the appropriate officials in the other Services.

Procurement

PROSPECTIVE CONTRACTOR QUALIFICATIONS

PROBLEM

Procurement directives impose constraints on judging contractor qualifications and responsibility prior to award. As a result, awards are sometimes made to equipment contractors who are unable to provide parts and service support after the equipment is put into use.

SOLUTION

Recommendation 11. Revise procurement directives to more specifically authorize consideration of contractor's current ability to provide parts and service support throughout the economic life of equipment in addition to consideration of contractor's current production ability and prior performance.

ANTICIPATED BENEFIT

- Greater emphasis will be placed on the authority and responsibility of the Contracting Officer for ensuring that the Government will obtain quality ETE on time and within budgets from suppliers who are in a good position to provide parts and service support for the expected life of the equipment.

BACKGROUND/DISCUSSION

One major problem faced by Contracting Officers is that of selecting a contractor who will deliver a quality product, on time, at a reasonable price. This is a difficult decision in most procurements but it is especially so in buying off-the-shelf electronic test equipment (OTS ETE).

Many marginal producers are willing to bid a low price, produce an item of marginal quality, and then move off to other work. When it comes to parts and service support for the equipment he produced, he may not be willing or able to support his own equipment.

Current procurement directives, as interpreted by many Contracting Officers, make it difficult not to award to the low bidder. If prior performance of the low bidder is questionable, the Contracting Officer must document the case thoroughly to "prove" that the low, marginal producer cannot make delivery,

will not produce a quality item, or has such a poor performance record that he should not receive the award.

Higher echelons of review are often necessary before a poor performer can be removed from consideration. Owing to the complexity of this time-consuming review process, some Contracting Officers avoid the hard decision and award to the low bidder even though he has limited capability and questionable financial resources.

One way to ensure timely delivery and avoid marginal products is for Contracting Officers to be especially thorough in their preaward evaluation of contractors. If, after an adequate preaward review of the low bidder, the Contracting Officer is convinced that the firm will not be able to produce the item on time and in accordance with specifications, the award should not be made to the low bidder. Such judgments should be based on careful analysis of such factors as the manufacturer's track record, the quality of products he has made previously, his financial condition, and the likelihood of his being in business later to support his product.

On large contracts, source selection boards are often used to assist the Contracting Officer in selecting a qualified source. On contracts that do not justify the expense of establishing a source selection board, it would be helpful for the Contracting Officer to have ready access to the resources of a technical evaluation panel. This panel could review the technical ability of the prospective contractor and help determine whether he is likely to be available to support his equipment in the future.

Recommendation 11 is related to Recommendation 15 in that it urges Contracting Officers to enforce contract quality and delivery terms equitably but firmly. These two recommendations together will help to ensure that quality OTS ETE will be delivered in a more timely manner and that parts and service support will be available from the contractor throughout the economic life of equipment.

IMPLEMENTATION

- Issue a DOD directive specifically requiring that a preaward survey on a proposed contract for OTS ETE include ability to provide parts and service for a reasonable future period. This requirement should be in addition to a thorough review of the Contractor's: Current condition. Prior performance record. Ability to deliver on time on recent contracts. Standards of quality. Financial capability.
- Place specific authority in ASPR to encourage Contracting Officers to establish technical panels to assist them in the evaluation of prospective contractors.

PROLIFERATION CONTROL

PROBLEM

Proliferation of different makes and models of electronic test equipment (ETE) in the defense inventory results in high operating and logistic costs. Proliferation is increased by awards to marginal suppliers and by retention of obsolete inventory.

SOLUTION

Recommendation 12. Establish DOD guidelines for standardization that provide for maximum use of off-the-shelf electronic test equipment while taking into account operating and logistic costs, obsolescence, competition, and the advancement of test equipment technology.

Recommendation 13.* Recognize that Preferred Item Lists (PILs) are a method of limiting inventory and related support requirements for electronic test equipment. PILs are valuable management tools but should not be so restrictive as to limit purchase to a single manufacturer's piece of equipment when similar off-the-shelf equipment is available.

ANTICIPATED BENEFITS

- Fewer repair parts to be cataloged, provisioned, and stocked.
- Optimum consideration of obsolescence factors.
- Reduction in requirements for the training of operators and maintenance technicians.
- Retention of competition particularly with small business and high-technology innovators.
- ASPR guidelines for the use of Preferred Item Lists (PILs) that, after initial competitive procurement, will help to control proliferation.

* See minority position following the discussion of this recommendation.

- Savings of about \$17.5 million per year.* This estimate is based on 50% of the potential savings expected by the Army through proposed use of PILs each of which identifies two equally preferred models.

BACKGROUND/DISCUSSION

Thousands of different makes and models of ETE are in the defense inventory. This proliferation of ETE has given rise to many procurement, operating, training, spare parts, and maintenance problems in the Military Services.

With more or less success, the Military Services have taken various approaches to controlling proliferation. But there are still no overall DOD guidelines for dealing with all aspects of this complex problem.

Standardization achieved on the basis of Military Specifications does not provide a universal solution. Much of the obsolete and obsolescent ETE now in the defense inventory was built to conform with a variety of Military Specifications. The problems of obsolescence and the costs of logistic support associated with the use of Military Specifications are addressed in the discussion of Recommendations 3, 4, and 5. An approach to the replacement of older ETE is set forth in the discussion of Recommendation 20.

One main cause of proliferation of ETE in the defense inventory has been the uncontrolled purchase of modified commercial ETE by the Services. This has given rise to problems of training military maintenance technicians and the stocking or manufacture of special parts to the extent they are needed to support the modified ETE.

Proliferation has also been a problem when commercial ETE has been procured from marginal suppliers who are ill-prepared to provide logistic support throughout the expected life of their products.

To bring the number of models in inventory to more manageable numbers and to reduce the costs of parts and maintenance, the Services use various management tools such as Preferred Item Lists (PILs). PILs are useful when it is essential or very highly desirable to control proliferation in order that the ETE selected to support a given system or organization will be compatible or fully interchangeable.

Each PIL relates to a single category of ETE required in the using agency's inventory. Only one model of one make is usually listed as the preferred model in each category; but agencies may

* Agreed upon by close vote of the Task Force.

list 2 preferred models on the PIL. Different PILs may be established for the same category of equipment by different using agencies within the same Service. At present, the Army is the only Service that contemplates the use of Service-wide PILs for ETE.

Before establishing a PIL, the originating agency evaluates its inventory and surveys all off-the-shelf (OTS) ETE in the relevant category that is available on the market. Based on this study, the agency selects one make and model of OTS ETE as the preferred item in the category. In this way, the PIL is a useful guide for managing current inventory and for planning the acquisition of new ETE.

However, the PIL is not of and by itself a justification for sole-source procurement. Pursuant to 10 U.S.C. 2304 (a) (13), purchases and contracts may be negotiated:

...for equipment that he (the Secretary) determines to be technical equipment whose standardization and the interchangeability of whose parts are necessary in the public interest and whose procurement by negotiation is necessary to assure that standardization and interchangeability. (ASPR 3-213.1)

But to justify a sole-source procurement under "Exception 13," the agency must submit a detailed explanation to the Assistant Secretary of the Service as to why a particular firm's product has been selected for standardization. Approval for sole-source procurements under Exception 13 has been granted sparingly by the Service Secretaries. So, in most cases, for each procurement the PIL must be reexamined and "opened up to competition" when "equal" OTS ETE is available from more than one source. Nevertheless, by using the PIL approach, the Army expects to reduce the number of ETE models in its inventory from about 5,000 to about 400.

In May 1975, an ARINC Research Corporation study for the Army concluded that over a 10-year period use of the PIL as a method of controlling proliferation had potential for saving about \$4.5 million on 3 items of ETE managed by the Army Communications Command. Based on this study, use of the PIL could save the Army some \$35 million to \$70 million a year on ETE support for the Army equipment.* This figure represents an extrapolation of the estimated savings on the 3 items to the Army's entire inventory of ETE. These savings would come from lower costs of spare parts, maintenance, training, and storage as the number of models in inventory is reduced.

*Source: Army Electronics Command, Fort Monmouth, New Jersey.

Another approach to controlling proliferation is to buy in large quantities on the basis of competitive negotiations that provide for follow-on requirements to be purchased from the same firm. In this manner, the identical item may be purchased for several years. The advantage of this approach is that the process of standardization begins on a competitive basis. The disadvantages are that follow-on purchases are made on a sole-source basis and that after the initial procurement the "standard" item will tend to lag behind advances in the state-of-the-art.

The problems of proliferation are greatest when the ETE procured is of special or modified commercial design. The use of such ETE usually entails special training of military maintenance technicians and the excessive stockpiling of spare parts in the DOD supply system or the time-consuming, expensive manufacture of special parts and assemblies.

Although rigid standardization of ETE is desirable in some cases, it usually creates more problems than it solves. Since many of the problems of proliferation are associated with central logistic support, these problems would be reduced if each user was able to receive the equipment, service, and repair parts directly from the manufacturer.

IMPLEMENTATION

- The Deputy Secretary of Defense should issue a directive providing guidelines on how PILs can be used as a means for controlling excessive proliferation of ETE without overly restricting competition.
- Clarify and improve ASPR standardization provisions (Exception 13) by specifically identifying approved standardization concepts and to provide guidelines for their use.

MINORITY POSITION ON RECOMMENDATION 13

The following minority position was provided by Task Force member Fred Katzmann:

This minority report on PILs is presented to indicate the strength of the original recommendation which was intended to ensure that competition be directed from the Services' top management levels to operating echelons. The sole-source cataloging is intended to be discouraged, minimized, identified, justified, and reviewed.

Minority Recommendation 13. Preferred Items Lists (such as MIL-STD-1364) are the preferred method to catalog specifications and requirements for representative electronic test

equipment including off-the-shelf electronic test equipment. These PILs are only to indicate salient or general limited specifications. They must not define a single manufacturer's piece of equipment unless it is controlled by a MIL-SPEC and Government-owned drawings are available to make it producible by more than one manufacturer.

A "preferred" ETE item listed in a PIL is therefore defined as one for which multiple approved sources are available and at least two or more may be listed in the PIL for guidance in competitive procurement and thereby control and limit proliferation.

Any savings in training and logistics thru less proliferation are believed to be negated if sole-source procurements are permitted for PIL requirements. Competitive procurements will produce more cost savings than controlled proliferation.

Listing of an ETE, OTS or otherwise, which is available from only one supplier is discouraged and such an ETE will not be considered "preferred." Nonpreferred items which may require listing will be indicated as "one source" items and the Service making the listing will be responsible for justifying the sole source and aggressively finding additional suppliers.

ANTICIPATED BENEFITS OF MINORITY POSITION

- Maintain competitive procurements when using PILs to control proliferation.
- A broader production base will result by avoiding sole-source procurement.
- Identify sole-source items in light of mobilization preparedness limitations and limit sole-source items by requiring justification and encouraging scheduled reviews to provide alternate items or sources.
- Maintain cost saving possibilities of preferred item standardization by assuring the ongoing benefits of competitive procurements.

BACKGROUND/DISCUSSION OF MINORITY POSITION

It is felt by some in industry that the way the PILs are being implemented will result in one manufacturer getting his item on the PIL and that others will not have an opportunity to compete for extended periods of time leaving only one supplier for a specific instrument or technology. It is also alleged that some Services are directing prime contractors to buy only PIL-specified ETE and nonlisted suppliers are being excluded from

competing. This is especially of concern since this Task Force is recommending that the Services buy freely from GSA Federal Supply Schedules.

Qualified Products Lists (QPL) have been in common use by all the Services for many items including OTS ETE. QPLs are interpreted to mandate two or more sources of supply and successfully have provided acceptable products competition as well as control of logistics and undue proliferation.

The presumed savings through nonproliferation must not be confused with the savings created by better inventory control and planned replacement of high maintenance or obsolete items.

The Air Force Optimum Reliability Through Effective Management (ORTEM) program at Kelly Air Force Base has proven most effective and should be continued and expanded.

The Navy has used MIL-STD-1364 and the savings from this longstanding program are not available to the Task Force for comparison with the Army's projected cost savings referenced in the anticipated benefits listed for Recommendation 13.

WARRANTIES

PROBLEM

Internal administrative procedures make it difficult for Government agencies to take advantage of warranties. The complexity of procedures related to shipping, property accountability, identifying responsibility for malfunctions, and other problems render many warranties of little value to the Government.

The problems become more complex for large, central purchases. In such cases, warranties tend to lapse before the items are placed in use.

SOLUTION

Recommendation 14. Establish procedures to assure that the Government receives the fullest possible benefit from commercial warranties.

ANTICIPATED BENEFITS

- Readily usable DOD procedures whereby ETE under warranty can easily be shipped back to vendors and promptly returned to service without encountering major property accounting and procurement roadblocks.
- Expedited repairs and reduced downtime through the effective use of warranty repair procedures.
- Improved feedback to manufacturers on ETE performance.
- Enhanced reliability through enforcement of effective warranty provisions.
- Estimated savings of about \$3 million per year by taking fuller advantage of active warranties. Many current commercial warranties are not now being invoked.
- Savings in training, staffing, and support requirements for highly skilled military technicians.

BACKGROUND/DISCUSSION

The Military Services very often forego opportunities for exercising standard commercial or special warranties which would conserve time, money, facilities, and technically trained military manpower.

Some purchases of electronic test equipment (ETE) by the Services do not provide for any kind of warranty. Although in most other ETE purchases, the manufacturer provides a standard commercial warranty, the Services seldom exercise them to full advantage.

Frequently, the Services rely on their quality assurance systems to assure that the ETE delivered is free of defects. The inspection clause for fixed-price contracts (ASPR 7-103.5) provides, in part, that:

Except as otherwise provided in this contract, acceptance shall be conclusive except as regards latent defects, fraud, or such gross mistakes as amount to fraud.

Such inspections are usually very costly. After acceptance, when ETE failures occur that are not the responsibility of the manufacturer, the Services must be prepared to make the repairs in-house or make special arrangements for funding and procurement of the repairs on contract.

In-house repairs of ETE tend to be very expensive. To make warranted repairs requires extra Government investments in facilities; diagnostic, repair, and calibration equipment; technically trained manpower; technical manuals; and spare parts inventory. Each such repair tends to present a special problem, especially in view of the frequent rotation of military technicians, since the using activity or nearest depot is hardly ever as well prepared as the manufacturer to service the disabled ETE.

At present, the Services seldom use the warranties they do have to full advantage. When warranted ETE is centrally procured in large numbers, the equipment often lies in storage, sometimes for a year or more, before it is placed in use. This usually means that some or all of the warranty period is rendered valueless to the Government.

Major problems arise even when the user is aware of the terms of the warranty and the ETE is delivered directly from the manufacturer and quickly put to use. When an ETE failure occurs, it is often difficult to determine the nature and extent of the repairs needed to restore the ETE to service. Sometimes the cause or causes and extent of the failure are not known until the ETE is dismantled for diagnosis and the repairs

are substantially accomplished. Very often, some of the necessary repairs are covered by warranty and some are not. Many such cases give rise to complex problems of funding and procurement authority which result in major delays.

Under present DOD procedures, it is difficult in many cases for field activities to ascertain the exact terms of the warranty and the precise period that the warranty on a given item is in force and to arrange and finance transportation of the warranted ETE to and from the manufacturer.

Owing to the delays, time, effort, and expense involved in overcoming such difficulties, many users elect to have the warranted repairs done in-house. In such cases, they forego the benefits of the warranty, impose a burden on their own technical personnel and facilities, and deprive the manufacturer of feedback that might prompt him to improve his product.

All reputable manufacturers of off-the-shelf (OTS) ETE offer commercial warranties as part of the purchase price. These warranties are generally for one year. Task Force discussions indicate that OTS ETE manufacturers include a contingency of about 1% in their prices to cover the cost of satisfying warranty claims. Assuming that less than 50% of the potential benefits of warranties is now being realized by the Government, due to ineffective implementing procedures, a potential \$1 million on the \$200 million of annual sales to the Military Services is foregone. Even if administrative and transportation costs offset half of this potential benefit, \$500,000 in annual savings would still be realized by improving DOD procedures for the exercise of warranties.

The Task Force estimates that an additional saving of \$2.5 million will occur if the Services make greater use of warranty repairs and do not attempt to make such repairs in-house. Most of this estimated saving would result from more efficient assignment of Government personnel. It is very expensive to train and support a staff of military personnel to perform ETE repair work that can be done much more efficiently by manufacturers who know their equipment much more intimately.

The multiple-award Federal Supply Schedules negotiated by the General Services Administration (GSA) overcome many of the problems associated with the exercise of warranties. The schedules enable the using activity to order OTS ETE from the manufacturer for direct delivery to the place of use. Since this GSA program provides for warranties on OTS ETE, the exact terms and period of effectiveness of the warranties can be readily ascertained by the using activity.

Moreover, some Federal Supply Schedules provide for service credits to the Government based on a percentage of total purchases against the schedule. These credits can be used to pay for work performed out-of-warranty or for nonwarranted repairs and can reduce administrative problems related to the return of equipment to manufacturers for services. To the extent of the available balance in the service credit account, repairs of ETE that may be out-of-warranty as well as calibration work is available through use of these credits without further cost to the using agency.

The warranty provisions of the Federal Supply Schedules for OTS ETE do not necessarily coincide with the standard commercial warranties offered by most OTS ETE manufacturers. Some members of the Task Force believe that it would be best for all concerned if the warranties in the schedules conformed with the manufacturers' regular commercial warranties and that if special warranties can be justified they should be priced separately and negotiated case-by-case.

Owing to the time and cost expended for transportation, the effectiveness of warranties varies with location. Some ETE manufacturers maintain a nationwide, and some a worldwide, network of service centers for their products; others do not. To some extent, the problems of excessive downtime and high transportation costs involved in the shipment of ETE to and from remote locations can be diminished by creating a highly selective, strategically located pool of reserve ETE that is ready for shipment wherever it is needed to replace ETE that is out of service for repair (see Recommendation 18).

Strengthening of the system for buying OTS ETE with warranties, either commercial or special, will encourage manufacturers to expand their repair capabilities. This should result in faster response to repair needs--and more important--encourage manufacturers to increase the reliability of their products.

In any event, DOD and GSA should give high priority to coordinating their policies and to simplifying their procedures for the use of warranties so as to reduce the cost of maintaining serviceable ETE.

Consideration was given to the use of Reliability Improvement Warranties (RIW) for OTS ETE. This concept is explored in the AIRINC Research Corporation report "Application of RIW to OTS ETE," October 15, 1975. The AIRINC report and the Task Force both concluded that the RIW concept is not appropriate for use with OTS ETE because it is based largely on the use of mature designs and does not increase the potential for significant growth in reliability.

IMPLEMENTATION

- Issue a DOD instruction that prescribes a feasible and practical method for expeditiously transferring warranted equipment to contractors for repair and return to the Government user.
- If the Services feel that extended warranties beyond commercial warranties are needed, they should be negotiated on a contract-by-contract basis.
- Institute a training program to make DOD personnel more aware of the benefits available under warranty repair.

Procurement

ENFORCEMENT OF CONTRACT TERMS

PROBLEM

Contract remedies for delayed deliveries, default, and unsatisfactory products are sometimes not adequately being enforced in the procurement of off-the-shelf electronic test equipment (OTS ETE).

SOLUTION

Recommendation 15. Reaffirm by DOD directive the policy of vigorous contract administration and enforcement of off-the-shelf electronic test equipment contract terms to establish a reputation in DOD of requiring compliance as generally being in the best interest of the Government.

ANTICIPATED BENEFIT

- The perceived reputation of Government procurement for coddling poor performance, thereby encouraging marginal suppliers to underbid, will be reversed and costs encountered in delays and delivery of marginal equipment will be avoided.

BACKGROUND/DISCUSSION

Standard provisions of Government contracts provide several remedies to the Government if the contractor fails to perform in accordance with the terms of the contract. Among these are default (1) where (a) the contractor fails to make progress so as to endanger performance or (b) does not deliver on schedule, (2) where the item delivered is defective and the Government requires correction or accepts the defective item but reduces the price, or (3) where the contractor's quality assurance or inspection procedures are defective.

Contract provisions are usually definite and complete and the penalties for noncompliance are explicit, but frequently the Government fails to enforce the contract. At times, this is because of a lack of aggressiveness. At other times, it may be advantageous to the Government not to enforce the contract. An example of the latter is when a contractor has failed to deliver in accordance with the delivery schedule and is therefore in technical default, but there is reasonable assurance that he will

deliver if given an extension of time to perform. This may be preferable to defaulting him and repurchasing from another source.

Fundamental to the use of contract remedies is the selection, at the beginning, of a contractor who can deliver a quality product, at a reasonable price, and on time. In buying OTS ETE, the Government sometimes awards contracts to firms that have marginal capability. Many such firms believe they can produce an item that they have never made previously. Contracting Officers should be encouraged by DOD to make hard decisions that will give them timely deliveries and not extended litigation. If personnel performing preaward surveys are forced to consider the Contractor's potential for supporting his equipment as well as an indepth analysis of his technical capabilities, financial resources, and performance records, many marginal firms will be eliminated, and there will be less need to pursue contract remedies with firms that cannot produce.

Once an award is made, the contractor's progress should be watched closely. If there are any significant signs that he will not produce a quality product on time, the Contracting Officer should advise him promptly that his contract may be terminated for default with all of the attendant penalties.

One major objective of this recommendation is to protect the small OTS supplier from the copier or loft operator.

IMPLEMENTATION

- DOD should issue a directive to reemphasize its policy that in buying OTS ETE (as indeed in all Government procurement), contract terms will be vigorously enforced to ensure that delivery is made at the time required and in accordance with specifications, and that, if contract terms are not adequately complied with, termination for default action will be taken promptly.

ASSIGNMENT OF CLAIMS

PROBLEM

Many manufacturers of off-the-shelf electronic test equipment (OTS ETE) have difficulty in arranging to have assignment of claims (receivables on a contract) acted on expeditiously by Contracting Officers. As a result of what appears to be slow administrative action, these assignments take a great deal of time to accomplish, and this delay results in cash flow and financing problems especially for small business.

SOLUTION

Recommendation 16. Modify ASPR 7-103.8 and FPR 1-30.703 to simplify the assignment of receivables on contracts of up to \$250,000 at the discretion of the contractor and under the terms of the Uniform Commercial Code.

ANTICIPATED BENEFIT

- Strengthen competitive positions of small business and other firms engaged in the manufacture of OTS ETE.

BACKGROUND/DISCUSSION

ASPR 7-103.8 and FPR 1-30.703 permit the assignment of claims under a contract so that a bank or similar institution may receive payments directly rather than having them sent to the contractor. In the usual financing arrangement, a contractor borrows money from a bank. The contractor then requests the Contracting Officer to amend the contract under the provisions of ASPR 7-103.8 or FPR 1-30.703 to permit payments under the contract to be made directly to the bank.

Normally, this can be done in an expeditious manner, and there are few legal or other problems that would hold up the issuance of this administrative-type amendment. Despite the intent of ASPR and FPR that this should be done in a routine fashion, it is difficult, in some cases, for contractors to arrange and other financial problems frequently arise. Since many OTS ETE contractors are small business firms, lack of cash can seriously impair their ability to perform.

IMPLEMENTATION

- DOD should invite GSA to participate in reviewing the problems encountered by contractors in the assignment of receivables to determine whether it is of such scope as to require changes in regulations or administration.

LOGISTICS

As addressed in this report, logistics encompasses the management of ETE inventory; provisioning, cataloging, and distribution of repair parts; and repair and calibration services provided both by contract and by Government personnel, including the manuals which provide instructions for repair and calibration.

The Task Force explored the full range of problems associated with the logistic support of ETE. As a result of this exploration, the Task Force closely examined the issues and formulated 7 recommendations concerning: More extensive exploitation of commercial support resources. Consolidation of calibration and repair facilities. Replacement of older, logistically expensive ETE. Standardization of documentation requirements for provisioning data and manuals. Training.

Logistics

LOGISTIC SUPPORT

PROBLEM

Current DOD logistic support systems often fail to take advantage of commercial resources that are available for the support of electronic test equipment (ETE). In many situations, the logistic support for ETE provided by DOD is more costly than the direct commercial support available to industry and Government. DOD policies and regulations encourage the optimum use of commercial sources for logistic support; however, these directives are not aggressively pursued.

SOLUTION

Recommendation 17. Have the Military Services take greater advantage of commercial support systems for the supply of repair parts, repair and calibration services, and training to the extent they can effectively and economically meet military needs.

Recommendation 18. Authorize the Military Services to budget for, acquire, and hold in reserve at appropriate locations a carefully selected "pool" of electronic test equipment end items to replace equipment temporarily out of service.

ANTICIPATED BENEFITS

- Reduced requirements on DOD supply systems by reduction of resources needed to provision, catalog, manage, stock, and issue repair parts for OTS ETE.
- Reduced total costs for logistic support of OTS ETE. Specifically, implementation of Recommendation 17 has the potential for saving an estimated \$7 million per year.*
- Reduction in the number of highly skilled military technicians needed and the degree of training required by such technicians for the calibration and repair of OTS ETE.
- Reduction of prime systems downtime caused by lack of essential OTS ETE. (Recommendation 18).
- Enhanced capability for using commercial support systems so they can be more readily expanded in response to a need for rapid mobilization

*See calculations at the end of this section of the report.

BACKGROUND/DISCUSSION

The Task Force studied all aspects of logistic support for ETE required by the Military Services. One basic finding of this study was that--although some cannot--most military requirements for ETE can be satisfied by products and support services that are readily available on the commercial market. Since they serve thousands of nonmilitary customers in many locations in the United States and abroad, many manufacturers of ETE are well organized to respond quickly to the needs of their customers for repair parts and for repair and calibration services.

Another basic finding of the Task Force is that--especially in the United States in normal times as well as times of national or local emergency--the Military Services can usually save ETE downtime, money, and training effort when using agencies are permitted to obtain repair parts and have the option of obtaining repair and calibration services for ETE directly from the factory or from factory-supported regional parts and service centers. Moreover, in almost every case, it takes less time and money to support OTS ETE than modified commercial ETE, which takes less time and money to support than ETE of special military design.

The policies and procedures of DOD, DSA, and the Military Services permit and often encourage the use of commercial support resources. DSA Regulation 4140.52, for example, states as policy that:

Consistent with military necessity, the Defense Supply Centers (DSCs) will, during peacetime, place optimum reliance on local management and the commercial distribution system ...

It appears, however, that this policy is not being pursued aggressively. Of more than 150,000 items coded "nonstocked" by the Defense Electronics Supply Center (DESC), only about 4,300 are coded for local purchase rather than central procurement. Even for these nonstocked items, less than 3% are identified for purchase from the commercial distribution system.

Procedures for combining the price advantages of large-volume buys with the efficiency of direct delivery to the user are commonplace in industry. The Federal Supply Schedules for ETE, which provide a readily usable basis for such a procedure, could be extended to provide for the purchase of parts and for optional use by military stations of factory or factory-supported regional service centers for the repair and/or calibration of ETE. More extensive use of such commercial services through the Federal Supply Schedules or similar arrangements would yield substantial cost savings, reduce military requirements for skilled ETE technicians, and, in many cases, reduce downtime for ETE. In

addition, greater peacetime use of such services by DOD agencies would strengthen the commercial support centers as a base for rapid expansion in the event of a national emergency.

Repair Parts

ETE users at facilities visited by the Task Force noted that critical needs for repair parts are often encountered that could best be filled by direct delivery from a manufacturer or supplier but that local purchase procedures are cumbersome. Some ETE manufacturers report that, in view of such procurement problems, they have frequently made emergency shipments of repair parts to military stations without charge.

Since direct commercial support is always an alternative used in emergencies, a simplified system should be developed for its use as the primary means of support of OTS ETE at all times. Federal Supply Schedules, or other indefinite delivery contracts, could be used to provide such a system. If the schedules included prepriced parts lists, the using activities would have a simplified means for obtaining direct delivery of parts, thereby avoiding costs now incurred in provisioning, cataloging, and wholesale stocking of parts.

One military activity* engaged in worldwide operation of a critical nature has established a "Quick Response Procurement" system for direct purchase of critically required parts by a local purchase office for delivery to users throughout the world. Essential mission requirements dictate the need for this system which provides an average 7-day delivery of parts compared with more than a month (often much longer and sometimes never) to receive support through the DOD supply systems. Another user at a contractor-operated repair and calibration facility** said that he was able to maintain an extremely short (5- to 8-day) repair turnaround time by direct purchase of parts not in Defense Supply Agency (DSA) stocks.

For many low-density instruments, the Services now rely on the commercial system for direct delivery of repair parts to using agencies. This practice should be extended to higher density ETE.

In most cases, the benefits from such arrangements would include:

* U.S. Army Communications Command, Fort Huachuca, Arizona.

** Precision Equipment Measurement Laboratory, Vandenberg AFB, California.

- Lower total costs for parts shipped directly from the commercial supplier to the point of use than for parts obtained through the DOD depot system.
- Elimination of depot costs for the wholesale (and usually excessive) stocking of parts that are readily available for direct delivery from commercial suppliers.
- Elimination of provisioning and cataloging costs for parts that can be ordered by using the vendor's part number.
- Faster delivery to the point of use.

However, in some special cases, provisioning, cataloging, and stocking may still be necessary to support military units deployed in remote locations.

Repair and Calibration

The rapid advances in ETE technology aggravate the personnel requirements of the Services. As newer instruments are added to the inventory, provision must be made for continuing training of ETE repair and calibration specialists. Use of commercial support services can relieve this problem in two ways:

- Manufacturers will be prepared to service their new products, thus trained technicians will be available at their service centers.
- To the extent that the calibration and maintenance load is shifted to the commercial sector, the need for ETE technicians in the Military Services will be reduced.

(Recommendation 19 addresses the advantages of using commercial support in connection with the consolidation of Calibration and Repair Facilities (CRFs).)

Training

The technology used in ETE has been advancing steadily and rapidly, with consequent increase in the sophistication of the instruments. While this increases the capability of the ETE and often reduces its failure rate, it also increases the training requirements for both the operator and maintainer of the instruments. ETE manufacturers have recognized these needs and have produced various training aids for use by their commercial customers. The Task Force believes that the Military Services should take greater advantage of these training aids and other training resources available from industry. (See the discussion of Recommendation 23.)

Reserve Equipment

Recommendation 18 addresses two objectives, while recognizing that present budgets are not adequate to cover all allocated requirements and thus cannot provide extra instruments for "float" to replace those that are in the calibration/repair cycle:

- Certain types of ETE are essential for maintaining particular weapon systems in an operational status. The availability of "float" ETE in these instances would minimize the possibility of the prime weapon system being "redlined" because the ETE is in the calibration/repair cycle.
- In some cases, the turnaround time for calibration/repair may be increased through use of the commercial support system. However, the longer turnaround time still may be cost-effective in terms of facilities, personnel requirements, training requirements, etc.

The availability of end-item float will permit use of the more cost-effective alternative when the impact of longer turnaround time would otherwise be unacceptable. Budget considerations will mandate that ETE for which float is provided be carefully selected on the basis of criteria such as the two objectives mentioned above.

IMPLEMENTATION

- Increase the command emphasis on present DOD policies that encourage use of direct commercial support resources.
- Review and improve, by simplification and extension, mechanisms involved in using commercial support.
- Require specific studies of high-density ETE types for the purpose of maximizing use of direct commercial support for these items.
- Establish operational and economic criteria for procuring end-item float in support of particular types of ETE.
- Budget for end-item float, using savings generated by Task Force recommendations.

POTENTIAL COST AVOIDANCE RELATED TO RECOMMENDATION 17

Implementation of Recommendation 17 has the potential for saving \$5.5 million per year if DOD purchased most of its OTS ETE spare parts for direct delivery from commercial sources rather than through the DOD depot system.

In fiscal 1975, DOD purchased more than \$467 million worth of ETE,* and the Task Force estimates that 80% of this figure, or \$373 million, was for OTS ETE and modified commercial ETE.

The Task Force estimates that the dollar value of spares acquired for new equipment is about 6% of the dollar value of the equipment itself. Therefore, it is assumed that 6% of \$373 million, or about \$22 million worth, of OTS ETE spare parts are purchased by DOD each year.

If half of this \$22 million in OTS ETE parts is already furnished directly from commercial sources or is purchased by the Military Services under parts support programs separate from the Defense Supply Agency (DSA), about \$11 million worth of OTS ETE spare parts, currently purchased through DSA, could instead be purchased for direct delivery from commercial sources.

What savings would result if this change were made? Studies by the Commission on Government Procurement in 1972 identified major differences in the total cost to the Government when commercially available items are delivered directly to the user from a commercial source rather than through the DOD depot system. The chart illustrates the elements of cost in the two cases:

- The top bar shows that for every \$100 of purchases made through the DOD depot system, administrative and distribution costs at the depot and user's station increases the total delivered cost to \$248.04.
- The lower bar shows that the cost of purchase and receipt of products is only \$147.19 for direct delivery systems even when a factor is applied for increased prices.

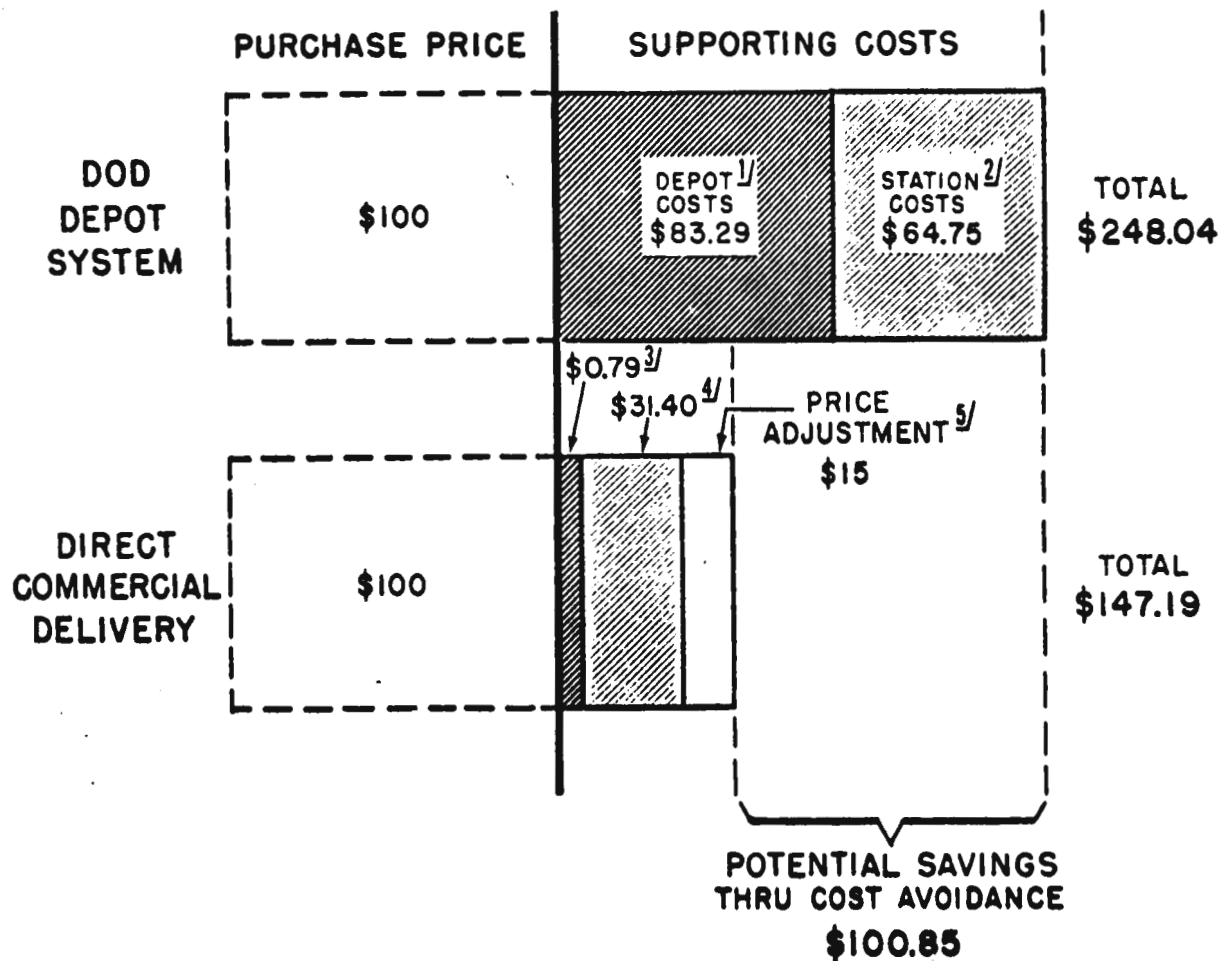
The depot costs cited are those of the Defense Electronics Supply Center (DESC); the direct delivery costs were incurred in support of facilities at four military bases. The referenced study also indicated that direct delivery systems also improved responsiveness to the ultimate user. The potential savings of about \$100 in administrative and distribution costs for each \$100 of purchases are cited here only to show the order of magnitude of differences in alternative procurement and distribution systems. Obviously, direct delivery systems should only be used when benefits in effectiveness as well as economy can be achieved and military necessity is fulfilled.

Assuming that this delivered cost differential can be applied to OTS ETE spares, DOD could save \$11 million per year by

*See introduction.

**COST OF PROVIDING COMMERCIAL PRODUCTS
TO ULTIMATE USER**

DOD DEPOT SYSTEM vs. DIRECT COMMERCIAL DELIVERY



Reference data from the Report of the Commission on Government Procurement, Volume 3:

- 1/ Average cost to procure, handle, and distribute goods priced at \$100--Defense Electronics Supply Center (DESC).
- 2/ Average cost to requisition and receive from the depot goods priced at \$100--sample of 4 military bases (Table F-8).
- 3/ Federal Supply Schedule negotiation 0.79% (page 71).
- 4/ Average cost to procure and receive goods priced at \$100 directly from commercial sources--sample of 5 military bases (Table F-8).
- 5/ Added factor of 15% for increased cost of direct delivery (Task Force estimate).

relying entirely on direct commercial support. Even if only half of the spares were suitable for direct commercial support, DOD could save at least \$5.5 million per year in ETE support costs alone.

In addition to the \$5.5 million annual savings from direct commercial support, further costs would be avoided by reduction in the number of repair parts requiring provisioning, cataloging, wholesale stocking and management and some reduction in the generation of excess. Since the number of items involved in the \$5.5 is unknown and some available research data is item oriented, a factor of 1,000 items (considered to be a reasonable estimate for repair parts) was used as a baseline. Cost avoidance figures developed from this baseline can be readily factored when/if the actual number of items becomes known.

Avoidance of Item Entry and Management

General Accounting Office Report LCD-75-420, "Effective Item Entry Control in the Complex Government Supply System Can Reduce Costs," November 20, 1975, identified costs incurred in entering and maintaining an item in the DOD Supply System as:

- \$200 for entry
- \$25 a year for cataloging
- \$100 a year for management
- \$40 a year for warehousing.

As of June 30, 1975, DSA Fact Book (RCS-026) identified about 70% of items managed by the Defense Electronics Supply Center (DESC) as centrally managed, stocked, and issued.

Research revealed that a National Stock Number can be expected to remain in the system for about 12 years.

Applying these factors:

- The cost to enter 1,000 items in the system and maintain them for the first year would be about \$350,000 (700 x \$365 for stocked items plus 300 x \$325 for nonstocked items).
- The cost to maintain these 1,000 items each year they are kept in the system thereafter would be about \$150,000 (700 x \$165 for stocked items plus 300 x \$125 for nonstocked items.)
- If extended use of the commercial distribution system resulted in eliminating the need to enter 1,000 items each year, the savings would build up each year, reaching a cumulative cost avoidance of about \$14.3 million over a 12-year period, or an average of about \$1.2 million per year.

Avoidance of Excess

Comparison of Defense Supply Agency sales (RCS: DD-DSA-(M)-96-0-MIN) versus of Military Service reported excess (RCS: DD-DSA-(M)-225-(C)) revealed that an average 11% of DESC sales figures were reported by the Military Services as excess during fiscal 1975. Assuming that only DESC-stocked items (70%) would be reported as excess, the 11% factor represents a potential cost avoidance of about \$400,000 ($\$5.5 \text{ million} \times 0.70 \times 0.11$).

Summary of Potential Cost Avoidance

Recapitulating the annual savings explained above, the total value (averaged over 12 years) is about \$7 million, as shown below:

Support system cost savings (direct commercial delivery in lieu of DOD depot system)	\$5,500,000
Avoidance of item entry and management	1,200,000
Avoidance of excess	<u>400,000</u>
	\$7,100,000

Logistics

CALIBRATION AND REPAIR FACILITIES

PROBLEM

Each of the Military Services maintains a worldwide network of calibration and repair facilities (CRFs) to assure that such capability will be available with minimum delay and maximum effectiveness. Although the need to consolidate CRFs has been clearly recognized by the Military Services, progress has been very slow in increasing CRF productivity, in introducing new technology, and in reducing CRF costs.

SOLUTION

Recommendation 19. Direct the Joint Logistic Commanders to place higher priority on efforts to:

- (a) Survey the personnel utilization, equipment, operating costs, and facilities costs of all Service calibration and repair facilities.
- (b) Identify calibration and repair facilities that can be advantageously consolidated or eliminated (either within a Service or among Services). Maximize cost savings by using the resources of the original manufacturers or of service contractors in either Government or commercial facilities as appropriate.
- (c) Provide simplified procedures either through General Services Administration Federal Supply Schedules or by other means that will facilitate the use of support resources available from electronic test equipment manufacturers.
- (d) Accelerate the effective application of emerging technology, such as automated calibration systems, to reduce requirements for skilled personnel. Consolidation and specialization of facilities would increase the economic feasibility of using such equipment.

ANTICIPATED BENEFITS

- Reduced cost of CRF services. Although the Task Force was not able to quantify all elements potentially subject to savings, a 10% reduction on elements specifically identified would amount to \$8.5 million per year. Savings from elements not quantified would substantially increase this potential.

BACKGROUND/DISCUSSION

The Task Force:

- Received information from the Services identifying the number and location of CRFs (see maps).
- Visited representative CRFs of the Air Force and Navy.
- Heard a briefing from the manager of a contractor-operated Air Force Precision Measurement Equipment Laboratory.

Based on this information and related data, the Task Force believes that major savings will result from the careful consolidation of proximate CRFs and greater use of contractor-operated CRFs.

The Services have recognized the efficiencies available from consolidation. The Joint Logistics Commanders, in response to DOD Directive 4155.1, are studying possible consolidation of CRFs in various areas. However, the resources available for these studies have been limited, and progress has been very slow. Greater attention to this program and intensified management direction would pay off in much earlier realization of major savings.

In 1967, a study of CRFs in the Puget Sound area concluded that all the CRFs are mission essential. A preliminary report on a study of CRFs in Hawaii identifies a number of practical consolidations that would result in corresponding savings. The Hawaii study, initiated in December 1973, was published in October 1975. A study is now underway of CRFs in Thailand. However, at the present rate of progress, it will be many years before studies of concentrations of CRFs in CONUS will provide recommendations for consolidations that will result in major savings.

The studies noted above reflect the viewpoints of the commands involved. The commands charged with CRF missions have a natural bias toward optimum performance of their individual responsibilities. Careful review of the studies by higher authority may be needed to evaluate tradeoffs between potential savings and modest compromises in operational priorities.

In all likelihood, the consolidation of CRFs would combine some CRFs that are now underloaded with some that are overloaded. Two benefits would be derived. For the underloaded CRFs, consolidation would increase the workload of the technicians, thus providing better opportunity for on-the-job growth with a resultant improvement in their overall capabilities. For the overloaded CRFs, consolidation would decrease the backlog of ETE awaiting calibration and/or repair, thereby increasing the availability of the ETE to the user.

Recommendation 19 has broader objectives than the simple consolidation of existing CRFs. The use of contractors to operate CRFs is an efficient mechanism, judging from the information provided from one such operation. Specific contractual obligations concerning ETE turnaround times in various circumstances are imposed on the contractor. Although the contract is for 2 years with option for a third, there is no long-term commitment to the contractor or his employees. The contractor is motivated to perform effectively by incentive fees and the possibilities of follow-on business. Under some circumstances, the Government could avoid the capital investment in the CRF and in the equipment needed to outfit such a facility. Such arrangements should be a primary option in any consolidation studies.

From various using agencies, the Task Force heard about the volume of paperwork that frequently delays or precludes the direct delivery of parts from commercial sources and the shipping of ETE to manufacturers for warranty and nonwarranty repairs. Recommendation 19 addresses the importance of developing procedures that encourage the use of commercial support resources. Recommendation 17 addresses the basic issue of expanding the use of commercial support systems by the Military Services. Recommendation 19 would make full consideration of commercial support a key part of consolidation studies, and it emphasizes that new and/or revised procedures will be needed to facilitate the use of commercial support.

Recommendation 19 also emphasizes the importance to the Services of exploiting new technology to reduce calibration and repair costs. The Military Services are already acquiring automatic calibration equipment and similar state-of-the-art equipment. To be cost-effective, much of this equipment requires a large workload. The consolidation of many smaller CRFs into fewer, larger CRFs will provide the conditions favoring automated equipment in a greater number of cases. This factor should be considered in all consolidation studies and should be applied in evaluating the potential savings available from consolidation.

To the extent that consolidation of CRFs provides more efficient use of service technicians, and to the extent that transfer of the calibration and repair workload is shifted either to contractor-operated CRFs or back to the manufacturer, the requirements for skilled military technicians will be reduced.

The key thrust of Recommendation 19, however, is that application of more resources in the short range and higher management priority to consolidation studies can accelerate substantial cost savings to DOD.

IMPLEMENTATION

- DOD should direct the Joint Logistics Commanders (JLCs) to accelerate the consolidation of CRFs and should allocate additional resources for this purpose.
- In their consolidation studies, the JLCs should consider contractor operation of CRFs and more extensive use of automated calibration equipment.
- The Services should formulate and implement procedures that simplify the use of commercial support services by CRFs. They should identify, through tradeoff studies, situations in which calibration and repair can be accomplished most efficiently by the ETE manufacturer.

POTENTIAL COST AVOIDANCE RELATIVE TO RECOMMENDATION 19

Considering the number of ways in which consolidation of CRFs can reduce costs, the Task Force believes that a comprehensive, aggressive consolidation program will result in a reduction of at least 10% in the present costs of operating CRFs. This is a conservative estimate since the Task Force was able to quantify only a part of the costs associated with CRFs.

The Army provided data on its Level A and C calibration facilities (see Table 1). The 135 Army facilities represent 45 fixed and 90 mobile activities. Calibration is performed primarily by mobile units.

The Navy provided data on its CRFs, separately identifying shorebased and shipboard CRFs (see Table 2). CRFs on ships and tenders and most shorebased Field Calibration Activities (user calibration) are excluded from the calculation of potential savings. Rationale for exclusion: cross-Service consolidation of CRFs afloat would result in compromise and degradation of mission; field calibration activities (FCAs) are an integral part of a maintenance organization, calibration is collateral to the primary maintenance function, and capital investment and resources for these FCAs are insignificant in relation to the overall cost of the parent activity. Of 156 shorebased FCAs, only five have capabilities that approach those of a Navy Calibration Laboratory (NCL).

The Air Force facilities (see Table 3) perform both calibration and repair on the equipment they handle. The Air Force data included calibration and repair actions on all precision measurement equipment (PME).

Table 1
1/
ARMY CALIBRATION FACILITIES

Location	Number of facilities	Government personnel	Contractor personnel	Personnel costs	Number of calibration actions	Floor space (sq. ft.)
CONUS						
Area Calibration Facilities	58	371	0	\$5,112,000	252,500	68,000
Depots with internal calibration mission	10	101	0	\$1,286,000	57,500	17,000
Other than depots with internal calibration mission	38	235	73	\$3,006,000	190,000	83,000
OCONUS	29	410	17	\$4,720,000	200,000	5,000
"C" level calibration performed in using units	2/ N/A	3/ 585	0	3/ \$7,344,480	3/ 347,500	2/ N/A
Total	135	1,702	90	\$21,468,480	\$1,047,500	173,000

1/ Exclusive of organizational maintenance.

2/ Not available.

3/ \$7,344,480 was factored from an estimated range of personnel (560 to 610; average 585).

The 347,500 is an average based on an estimated range of 335,000 to 360,000 units.

4/ Includes 90 mobile and 45 fixed facilities.

Source: Department of the Army.

Table 2

1/
NAVY CALIBRATION FACILITIES

Location	Number of facilities	Personnel			Personnel costs (000)	Number of calibrated actions	Floor space (sq. ft.)
		Government		Contractor			
		Military	Civilian				
NONSHIPBOARD							
Type I Standards Laboratories	2	--	26	--	\$479	6,000	10,000
Type II Standards Laboratories	6	--	92	--	\$1,545	22,000	21,000
Navy Calibration Laboratories (NCLs)	54	--	1,420	20	\$21,695	857,000	162,000
Field Calibration Activities (FCAs) (user calibration)	156	500	--	--	\$4,812	184,000	75,000
SHIPBOARD							
Field Electronic Calibration Laboratories (FECLs)	32	279	--	--	\$2,684	124,000	38,000
Field Calibration Activities (FCAs) (user calibration)	176	600	--	--	\$5,774	207,000	70,000
Total	426	1,379	1,538	20	\$36,989	1,400,000	376,000

1/ All figures reflect electrical/electronic only.

2/ Exclusive of contractor.

3/ Gross estimation.

Source: Department of the Navy.

Table 3

AIR FORCE PRECISION MEASUREMENT FACILITIES

Facility Type	1/ Number of facilities	2/ Personnel		3/ Total	Personnel costs (000)	3/ Number of calibration/ repair/actions	4/ Floor space (sq. ft.)
		Military	Civilian				
IIA	9	112	918	--	1,030	\$13,491	222,000
IIB	105	1,540	182	10	1,722	\$22,145	487,000
IIC	8	132	168	102	300	\$3,899	146,000
III	10	15	--	23	15	\$192	11,000
Total	132	1,799	1,268	135	3,067	\$39,727	866,000
							636,000

1/ Type IIA--Laboratories providing support to AFLC Technology Repair Center and/or geographical areas.
 Type IIB--Normal Air Force Base level laboratories performing intermediate level calibration and repair of PME used in support of aircraft, missile, and ground operating systems.
 Type IIC--Laboratories providing calibration and repair of PME used in research, development, test, and evaluation programs that are usually conducted under the direction of the Air Force Systems Command.

Type III--Special laboratories tailored to the needs of specific operational systems.

2/ Reflects Air Force estimate that 79% of total manhours expended in AF PMEL operations are for calibration and repair of ETE.

3/ Exclusive of contractors.

4/ Assumes that 79% of actions are for ETE.

Source: Department of the Air Force.

The calibration and repair facilities cost data may be summarized as follows:

	<u>Number of facilities</u>	<u>Number of personnel</u>	<u>Personnel costs (\$ millions)</u>	<u>Floor space (sq. ft.)</u>
Army*	135	1,792	21.4	173,000
Navy**	67	1,598	24.3	197,500
Air Force	<u>132</u>	<u>3,067</u>	<u>39.7</u>	<u>636,000</u>
	334	6,457	85.4	1,006,500

A reduction of only 10% in the above noted personnel costs alone would provide savings of \$8.5 million per year. Moreover, to the extent that consolidation avoids the need for construction of additional space for calibration and repair, or makes available space needed for other purposes, construction costs will be avoided.

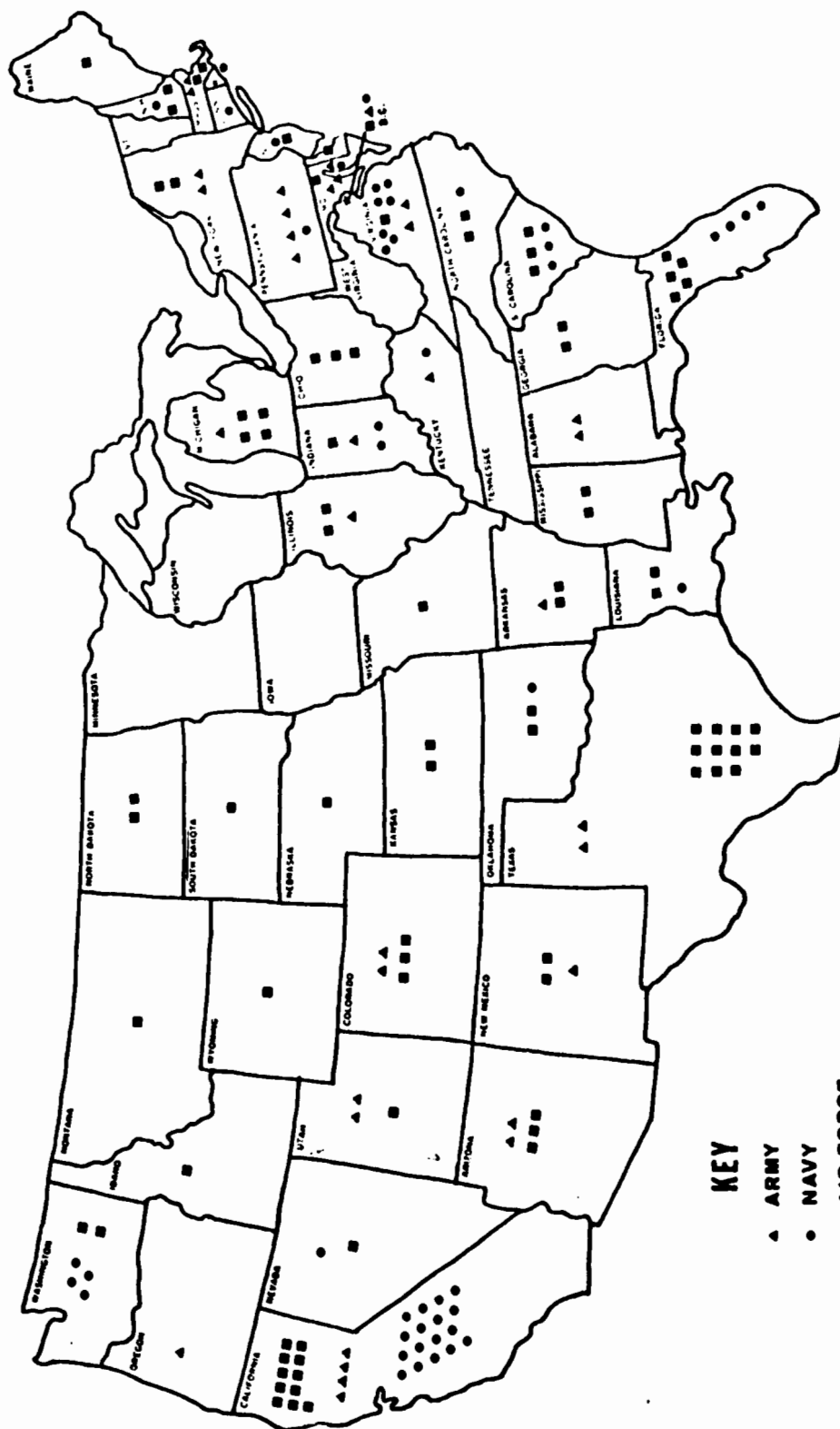
*Army figures do not include equipment repair.

**Includes five Field Calibration Activities (user calibration) with capabilities that approach those of a Navy Calibration Laboratory.

Source: Departments of the Army, Navy, and Air Force.

CALIBRATION AND REPAIR FACILITIES

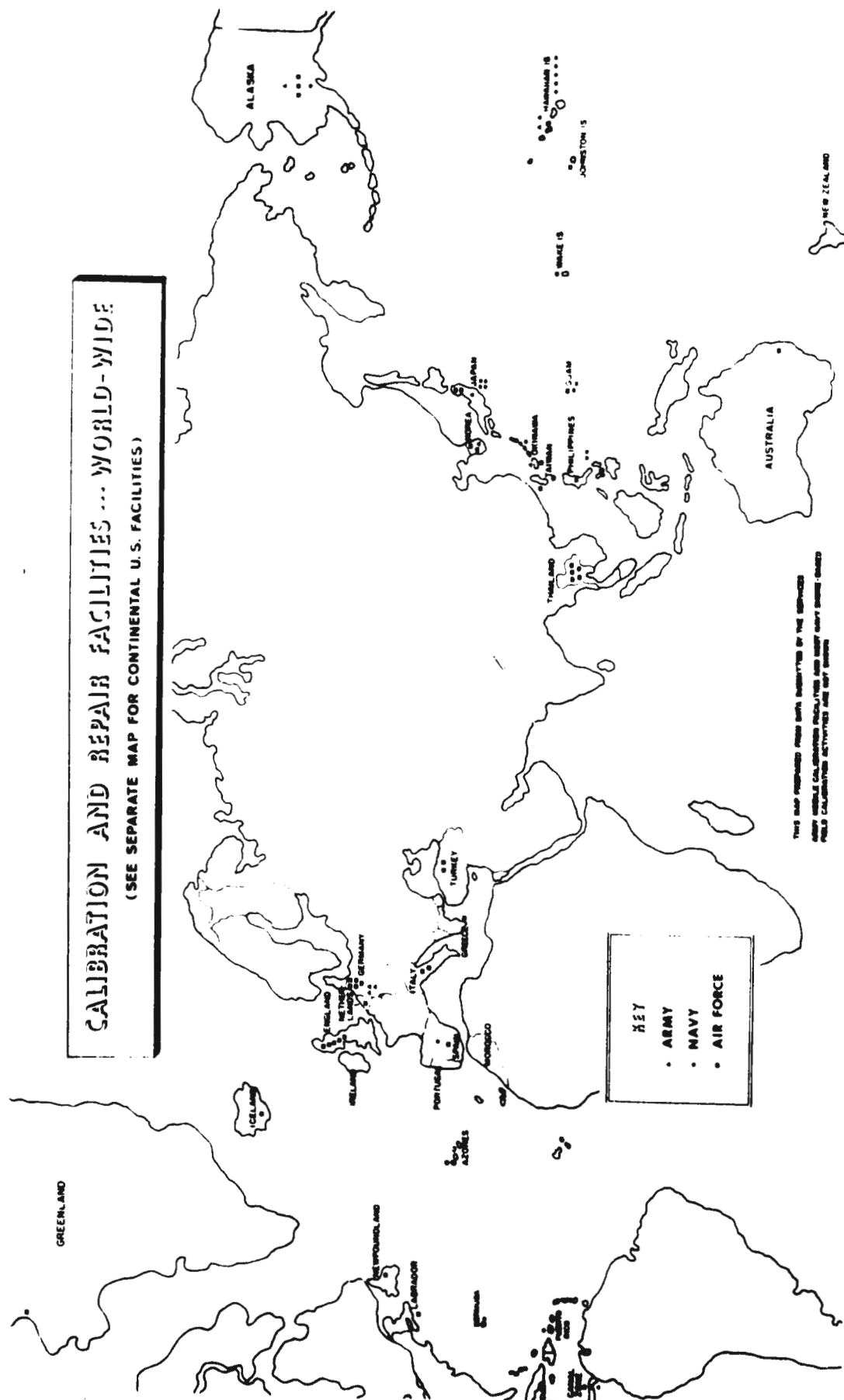
(SEE WORLD-WIDE MAP FOR ALASKAN AND HAWAIIAN FACILITIES)



KEY

- ▲ ARMY
- NAVY
- AIR FORCE

THIS MAP PREPARED FROM DATA SUBMITTED BY THE SERVICES. ARMY MOBILE CALIBRATION FACILITIES AND MOST NAVY SHORE-BASED FIELD CALIBRATION ACTIVITIES ARE NOT SHOWN.



Logistics

REPLACEMENT OF OLDER ELECTRONIC TEST EQUIPMENT

PROBLEM

The Military Services have had difficulty in providing cost-effective logistic support for older electronic test equipment (ETE). Since there is usually a lack of funds for its replacement, older ETE that is no longer cost-effective to maintain and use tends to remain in the active inventory.

SOLUTION

Recommendation 20. Expand present procedures for systematically replacing older electronic test equipment based on cost of ownership, and provide recognition in the budgeting process to accomplish this. Clarify policy and develop more workable procedures for implementing ASPR 4-200 to facilitate the sale of older electronic test equipment and use of the proceeds for the purchase of new equipment.

ANTICIPATED BENEFITS

- Achieve savings of about \$9 million per year (averaged over the first 10 years) related to ORTEM.* Annual savings reach \$30 million after 8 years.
- Provide about \$6 million in resources from the sale of older ETE to offset the cost of modern replacement ETE.*
- Replace ETE that can no longer be maintained and used on a cost-effective basis.
- Enable DOD to take greater and earlier advantage of new technological developments.
- Reduce manpower requirements for skilled technicians.
- Provide recognition in the budget process for upgrading ETE with currently available commercial equipment.
- Attain greater ETE reliability at lower operating and maintenance cost.
- Reduce proliferation.

*See background discussion for calculations.

BACKGROUND/DISCUSSION

The difficulties and high costs of providing logistic support for older ETE have led the Military Services to seek the best method for replacing these items.

One of the most significant efforts to date is the Air Force "Optimum Reliability Through Effective Management" (ORTEM) program which provides for collection and use of inventory and maintenance data. The data (such as asset availability, reliability, manhours to repair and calibrate) are correlated with established criteria to identify candidates for replacement.

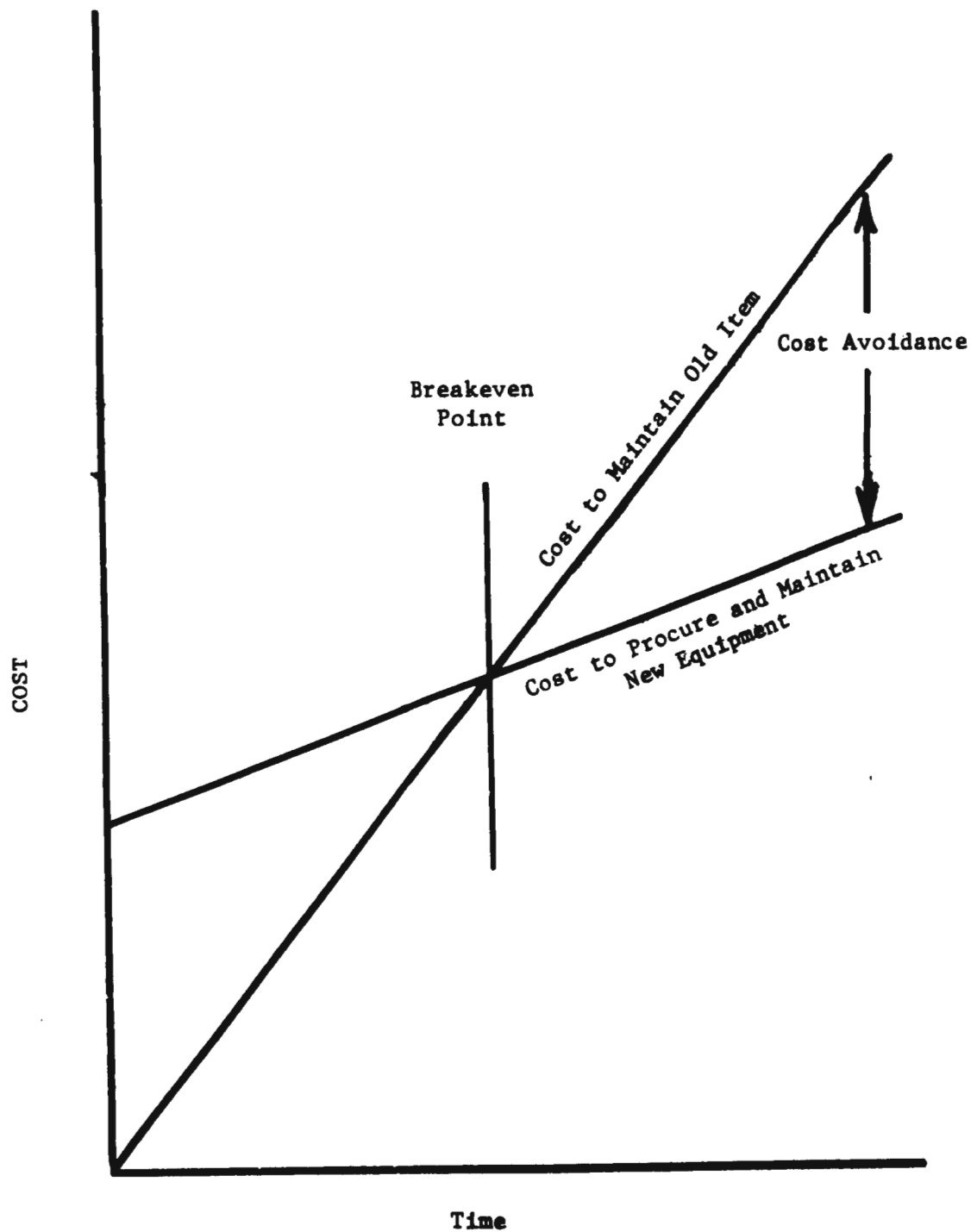
The accompanying figure is a typical graph resulting from an ORTEM analysis. The graph compares projected ownership costs of older equipment in inventory with acquisition and ownership costs of new equipment to replace the old. Note the crossover point for the two lines as the cumulative ownership savings obtained with the new equipment accumulates to offset its acquisition cost. While the overall effectiveness of the ORTEM program cannot yet be fully assessed, experience to date indicates a potential for considerable savings.

The ORTEM concept offers a potential for improved ETE reliability by replacing obsolete ETE with new state-of-the-art ETE and a technique for supporting budget requirements for replacement ETE. ORTEM results should be evaluated and compared with other methods. Consideration should be given to adopting ORTEM techniques found to be better than those now in use.

Savings from an ORTEM-type program appear as reductions occur in labor and material used in calibration/repair activities. In principle, part of these savings can provide the resources for replacement of additional older ETE if a mechanism existed in the budgeting process to add resources to a procurement item in recognition of reductions in O&M items. In practice, this mechanism will be very slow because of the time needed to accumulate data substantiating the savings. To realize the potential savings as early as possible, it is suggested that part of the savings resulting from the Task Force recommendations be earmarked for this purpose.

There are two main avenues open to the Military Services for disposing of ETE that is no longer required. One is through established DOD Material Utilization and Disposal Programs. The other is through the exchange/sale provisions of ASPR 4-200.

Serviceable items excess to local military needs are normally reported through established channels for possible use by another Service or agency. If no requirements are identified, the item is directed to the designated Defense Property Disposal Activity (DPDA) for final screening and ultimate sale or donation.



Source: Headquarters, San Antonio Air Logistics Center.
Replacement of Older Electronic Test Equipment

Unserviceable items beyond economical repair are sent directly to the DPDA. Service visibility is lost when items are processed to the DPDA, and proceeds from sales are deposited to a Central Deposit Fund Account. (The return on the dollar in fiscal 1975 was about \$0.07.)

ASPR 4-200 sets forth policies and procedures that permit DOD to exchange and sell personal property and apply the proceeds of the sale to the acquisition of similar property for replacement purposes. The authority for DOD to do this appears in Section 201 (c) of the Federal Property and Administration Services Act of 1949, as amended (40 U.S.C. 481 (c)), which states:

In acquiring personal property, any executive agency, under regulations prescribed by the Administrator, subject to regulations prescribed by the Administrator, for Federal Procurement Policy pursuant to the Office of Federal Procurement Policy Act, may exchange or sell similar items and may apply the exchange allowance or proceeds of sale in such cases in whole or in part payment for the property acquired: Provided, That any transaction carried out under the authority of this subsection shall be evidenced in writing.

The General Services Administration has delegated to DOD the authority to make these exchanges and sales, and DOD has issued DOD Instruction 4160.1 which explains how this may be done.

The concept of ASPR 4-200 appears to be based on the need for a mechanism to replace equipment with new or more economical equipment. At present, this arrangement is only used at base level where it is easy to maintain control of the equipment. In central procurement, where single purchases are made for a large number of replacement items that are distributed to many agencies, the present ASPR procedures are difficult if not impossible to administer. The concept, therefore, is not being fully utilized. For the Services to benefit from this authority, it will be necessary to rewrite ASPR 4-200 to make it a practical alternative that can be used in all types of procurement.

Clarification is needed to confirm that it is DOD policy to use this technique to obtain funds to buy replacement ETE, and the Services should be encouraged to use this technique with a minimum of restrictions. The incorporation of necessary changes to current instructions should result in greater use of the ASPR provision by the Military Services. This in turn should produce a greater dollar return for DOD through expansion of negotiated sale and provide more needed dollars at operating levels for replacement upgrading of ETE.

IMPLEMENTATION

- DOD should issue a directive to the Military Services requiring an evaluation of present replacement techniques, including ORTEM. A method of ETE replacement that incorporates the best features of all Services techniques should then be implemented in DOD by a specific date. Part of the savings realized from implementation of Task Force recommendation should be used to replace obsolete ETE,
- DOD should revise ASPR 4-200 and DOD Instruction 4160.1 to: (1) Update Federal supply classes that are currently incorrect. (2) Change policy from replacement of like item to replacement of any item. (3) Change policy to permit a DOD sale to one firm and purchase from another firm, applying the proceeds from the sale without any like-item restrictions.

POTENTIAL COST AVOIDANCE RELATED TO RECOMMENDATION 20

The Air Force is currently funding new equipment under the ORTEM program at a level of about \$12 million annually. The Air Force personnel involved believe this to be an effective level. For one recent purchase of 1,560 oscilloscopes, at a cost of just over \$2 million, the ORTEM program projected a 2-year labor saving of 42,235 hours by replacement of old oscilloscopes. At \$20 per hour, this corresponds to an average annual saving of about \$420 thousand. If this ratio of savings to investment applies to the entire \$12 million annual ORTEM investment, the corresponding annual saving would be about \$2.5 million.

Similar programs could produce equivalent savings for the Army and Navy. If the scope of the program for each Service were about equal to that of the Air Force, total cost of new ETE would be about \$36 million for the three Services. Annual savings resulting from the lower maintenance costs for this replacement ETE would be about \$7.5 million. During the early years, the annual investment costs would exceed the annual savings, but the latter will increase year-to-year as additional groups of older equipment are replaced. After the fifth year, the annual saving would reach \$37.5 million, exceeding the annual investment. After 8 years the annual saving would exceed annual investment by about \$24 million. If the equipment that replaces the older equipment is in turn replaced after 8 years, the \$24 million would be the steady state annual saving. (This conservative assumption of an 8-year life assures that the maintenance cost of the replacement ETE will never become excessive, thereby reducing the saving.)

The required annual investment would be reduced to the extent that funds realized from the disposition of old ETE can be applied to the purchase of replacement ETE. The Task Force estimates that \$351 million of ETE is acquired each year excluding spares (\$373 million less 6% for spare parts). Assuming that older ETE with acquisition value totaling about 1/4 of this amount (some \$88 million) is suitable for disposal, a return of \$0.07* on the dollar would yield some \$6 million to be applied toward the cost of the replacement ETE. (The \$88 million figure is considered realistic, representing less than 5% of the Services total inventory of \$1.8 billion in ETE.) This return would be at the expense of disposal proceeds currently deposited to the Deposit Fund Account (DFA), but the benefits should be more appropriately applied to replacement of older ETE. Further, it would provide an incentive for development and improvement of economical replacement techniques by the Military Services.

This \$6 million resource would reduce the required annual investment to about \$30 million. The annual saving would then equal the annual investment after 4 years rather than 5. The saving would exceed investment by \$30 million annually after 8 years and would remain at that level. Over the initial 10-year period, the total investment would be \$300 million, and total savings would be \$390 million, for a net saving of \$90 million. The average annual saving over this 10-year period would be \$9 million.

*"Program Administrators Progress Report--DOD Material Utilization and Disposal Programs, Statistical Review and Management Evaluation (First Half FY 1975)." Defense Supply Agency, Alexandria, Virginia, May 1975.

COMMERCIAL MANUALS

PROBLEM

The requirements for acceptability of commercial manuals for off-the-shelf electronic test equipment (OTS ETE) are not sufficiently uniform among the Military Services to enable the manufacturer to produce a manual with confidence that it will be accepted by all Services. The Services do not fully recognize that most OTS ETE manuals have been well designed to service a wide variety of commercial customers.

SOLUTION

Recommendation 21. Establish uniform tri-Service requirements to enable industry to produce commercial manuals that will be accepted by all Services without rewrite. Special requirements unique to one Military Service would be ordered in addition to the commercial manual.

ANTICIPATED BENEFITS

- Cost avoidance of an estimated \$1.2 million if full use were made of commercial manuals.
- Availability of acceptable manuals with OTS ETE at the time of purchase.
- Wider acceptance by commercial and military users of industry-developed manuals that have been found to be well suited to a variety of users.

BACKGROUND/DISCUSSION

MIL-M-7298C establishes requirements for commercial manuals, but its definitions are so general that the acceptability of any given manual can be variously interpreted. Experience of ETE manufacturers is that a given manual may be accepted by one Service while a second Service will contract for significant revisions to the manual. ETE manufacturers represented on the Task Force and in the observer group stated that their commercial manuals could include a number of specific items that have been proposed for inclusion in MIL-M-7298C at no significant increase in cost. MIL-M-7298C should be revised to enable ETE manufacturers to produce manuals that will be acceptable to all Military Services.

Each Service that wishes to add Service-peculiar information should acquire it as a supplement that does not require revisions to the standard commercial manual.

Since MIL-M-7298 covers commercial manuals for all classes of equipment, it may be desirable to provide a separate Military Specification tailored specifically to OTS ETE (and, perhaps, similar classes of equipment). Such an approach is allowable within the MIL SPEC system; for example, MIL-M-0038510B is a special revision of a basic specification that applies primarily to integrated circuits for Air Force ballistic missile and space equipment.

As now developed and published, many commercial manuals are not acceptable to military users. Most military manuals have a spare-parts orientation not found in many commercial manuals. Commercial manuals tend to omit details that may be needed by military trainees, many of them are written to a higher level of skill than is expected of the intended military user, and some appear to be inadequate for use at any level of skill.

There must be some give and take in resolving this problem. The Military Services can relax some requirements, such as attaching many specifications to the basic commercial manual specification. Industry should be able to provide more parts-related data and write its manuals to the skill levels expected of military trainees at little or no extra cost to the buyer of an end item. However, it must be realized that no manual can be effective for personnel that do not possess relevant mechanical aptitudes nor can such personnel be expected to make reliable, economical repairs.

Implementation of Recommendation 21 will avoid the cost of having ETE manufacturers revise their commercial manuals. Much greater costs can be avoided if the Services eliminate, or at least greatly curtail, the practice of requiring manufacturers to rework their commercial manuals into special multilevel military formats.

In many cases, the Services now simply assign a manual number and apply a cover sheet to the commercial manual. With the availability of commercial manuals that meet coordinated tri-Service standards, this practice should become almost universal. The generation of special military manuals for OTS ETE should become a rare exception.

IMPLEMENTATION

- DOD should establish an inter-Service working group to develop commercial manuals for OTS ETE that can be used by the Military Services without modification. However, provisions should also be made for the special ordering of any additional Service-peculiar technical documentation that may be required. Dates should be specified for publication and implementation of the new criteria.
- DOD should request that Federal Supply Schedules for OTS ETE specify which manuals are included in the price of the end item, the price for additional copies, and the prices of related manuals that are available from the manufacturer.
- If the manufacturer's commercial manual meets the new tri-Service criteria, special review and approval by appropriate authority should be required before military-format manuals are procured. For example, the single manager for ETE in each Service (Recommendation 24) would be an appropriate review authority.

POTENTIAL COST AVOIDANCE RELATED TO RECOMMENDATION 21

The Military Services use existing commercial manuals to varying degrees. Two of the Services advised that commercial manuals, while accepted for the most part "as is," are often found to be inadequate and require the Services to provide special supplementary guidance either before or after the commercial manuals reach the field. A third Service has found it necessary to authenticate commercial manuals (at a cost of \$6,000 to \$15,000 per manual) and in many cases publish their own technical manuals for field use.

Based on data provided to the Task Force, it is conservatively estimated that military technical manuals are now being produced at the rate of 16,000 pages per year at a cost of \$150 per page, or \$2.4 million (excluding authentication costs). If Service-industry efforts to provide acceptable commercial manuals are fruitful and if only half of the current effort could be eliminated, costs on the order of \$1.2 million would be avoided.

Logistics

PROVISIONING DATA

PROBLEM

Each of the Military Services takes a somewhat different approach to the provisioning of off-the-shelf electronic test equipment (OTS ETE). These differences often entail duplication of effort by a manufacturer who sells identical ETE to more than one Service. Such duplication of effort increases the cost of provisioning to the Department of Defense.

SOLUTION

Recommendation 22. Implement uniform tri-Service documentation for provisioning off-the-shelf electronic test equipment and modifications thereof, but omit documentation except in special circumstances where required to meet military needs.

ANTICIPATED BENEFITS

- Lower cost to the manufacturer for the preparation of provisioning documents results in lower cost to the Military Services.
- Repetitive or selective use of provisioning data as required.
- Reduced requirements for provisioning of spare parts and related support equipment.

BACKGROUND/DISCUSSION

Provisioning is the process of selecting the range and number of items (spare and repair parts, special tools, and test and support equipment) required to support an end item for an initial period of service. The process identifies items of supply; establishes data for the preparation of catalogs, technical manuals, and allowance lists; and provides instructions to assure timely delivery of the selected support items.

MIL-STD-1561 sets forth DOD provisioning procedures. MIL-STD-1552, which is still in process of implementation by the Military Services, provides formats and instructions for manufacturers who are required to develop Provisioning Technical Documentation (PTD) in support of end items sold to the Military Services.

However, differing maintenance support concepts adopted by the Military Services sometimes call for different levels of provisioning. Thus, one Service may provision at the depot level, and another may provision at the organizational level. Costly problems arise when depot level ("long-form") provisioning is inconsistent with organizational level ("short-form") provisioning; that is, when the short-form is not an identical subset of the long-form. This problem is especially troublesome when, as sometimes happens, an end item first provisioned in short-form must later be provisioned in greater detail.

To eliminate costly redundant provisioning efforts, implementation of MIL-STD-1552 for ETE should be based on coordinated tri-Service requirements that will facilitate provisioning at any level for any Service by simply manipulating the same basic data. If the more detailed depot-level provisioning were done first, the organizational level data could be extracted from it verbatim, without further effort.

In the same vein, the Task Force believes that the Military Services tend to require provisioning data for OTS ETE in much greater depth than is necessary or useful. For example, extending the provisioning process to sheet-metal parts and to standard hardware is warranted only in exceptional circumstances.

Greater reliance on the commercial distribution system for the supply of repair parts (Recommendation 17) will reduce the number of parts for which provisioning is necessary, and improved identification of repair parts in commercial manuals (Recommendation 21) will often suffice for provisioning purposes.

IMPLEMENTATION

- DOD should direct the Military Services and the Defense Supply Agency to convene a provisioning group chaired by a lead Service. The group should jointly develop uniform criteria for provisioning OTS ETE and uniform documentation requirements that will facilitate the elimination of redundant provisioning efforts.
- Instructions resulting from this group effort should be applicable to all Military Services and be published as a change to the appropriate MIL-STD provisioning document or as a new DOD directive.

Logistics

TRAINING

PROBLEM

The rapidly advancing state-of-the-art requires constant updating of the skills needed to operate, maintain, and repair off-the-shelf electronic test equipment (OTS ETE). The serviceability of modern ETE will be seriously affected if military training in this dynamic field does not keep pace with technology.

SOLUTION

Recommendation 23. Select and employ the most thorough and effective curricula and techniques, including those available from industry, for the training of user-technicians in the application and use of electronic test equipment and of instrument repairmen in the maintenance of such equipment.

ANTICIPATED BENEFITS

- Improved operation of equipment.
- Fewer equipment failures due to operator error.
- Increased maintenance/calibration productivity.
- Better use of equipment.
- Improved technical competence within the Military Services.
- Better qualified technicians for assignment to overseas and remote locations.
- Lower cost per repair.
- Less damage from inept repairmen.

BACKGROUND/DISCUSSION

The training capabilities of the Military Services and of industry are not being applied to full advantage by all users of OTS ETE. Industry is constantly developing advanced training aids and techniques that could be readily obtained and used by the Military Services to improve skill levels. Joint Government/Industry use of training aids, techniques, courses, facilities, and other training resources should be encouraged and expanded.

IMPLEMENTATION

- DOD should encourage the Military Services to expand ongoing efforts and jointly identify training capabilities that can be used by more than one Service.
- Each Military Service should further solicit the views and support of industry with the goal of making use of the best available training techniques and training aids.

MANAGEMENT

In the course of its studies and deliberations, the Task Force noted that: (1) The full impact of decisions concerning ETE tends to escape Service-wide management attention since such devices are generally regarded as an obscure part of weapon system supply support. (2) Frequently, the recommendations of task groups and special study efforts are "filed and forgotten."

Based on its examination of these problems, the Task Force formulated 5 recommendations concerning: Acquisition management. Followup on Task Force recommendations

ACQUISITION MANAGEMENT

PROBLEM

The full impact of decisions concerning electronic test equipment (ETE) tends to escape Service-wide management attention. This is particularly true for weapon systems since ETE is generally regarded as an obscure part of weapon system supply support. As a result, such decisions tend to be made on an ad hoc program-by-program basis without formal, direct reference to interprogram experience, the Service's overall budget, and the posture of its ETE inventory. A sharper Service-wide focus on ETE would tend to improve the quality of program decisions related to the selection and acquisition of ETE.

There are significant differences in the overall cost to the Government of acquisition and use of electronic test equipment such as:

- When it must be built specially to meet the detailed requirements of a Military Specification.
- When commercial off-the-shelf equipment can be used or modified to fulfill military performance requirements.
- When the requirement can be satisfied by the purchase of off-the-shelf (OTS) equipment from a commercial supplier using prepriced contractual arrangements.

However, there are no generally recognized guidelines for judging the magnitude of these differences. In the absence of readily usable guidelines, major opportunities for saving are frequently overlooked when ETE is specified by the Military Services. Current guidelines revolve around "minimum" system maintenance cost. They do not recognize the interfaces with other deployed systems/equipment or methods of acquisition.

SOLUTION

Recommendation 24*. Place both general-purpose and special-purpose electronic test equipment under a single manager in each Military Service.

*See minority position following subsection on Implementation.

Recommendation 25. Identify and consider significant administrative and other indirect cost differentials associated with the acquisition of electronic test equipment when: (a) it is built specially to conform with a Military Specification, (b) a commercial product can be used or modified to fulfill military requirements, and (c) an off-the-shelf product can be purchased using prepriced contractual arrangements to meet military needs.

ANTICIPATED BENEFITS

Implementation of these recommendations within each Military Service would:

- Assign responsibility for establishing ETE acquisition policy based on full consideration of all significant operational and cost factors.
- Provide the clear overview needed to achieve cost-effective management of ETE within the Service.
- Give greater visibility to Service-wide requirements and budgets for, investments in, and inventories of ETE.
- Take advantage of Service-wide experience (successes and failures) in the selection and acquisition of ETE.
- Avoid the high direct and indirect costs, time lags, performance risks, in-plant inspections, special provisioning, and dangers of obsolescence associated with the acquisition of ETE on the basis of Military Specifications when the requirement can be fulfilled through the use of OTS ETE or modified commercial ETE.
- Facilitate the transfer of ETE that is surplus for one user to fulfill the requirement of another user.

BACKGROUND/DISCUSSION

A single manager for ETE would be in a position to provide budgetary oversight and cost-effective management of the selection, acquisition, calibration, use, maintenance, and repair of the ETE needed to fulfill Service-wide requirements.

At present, prime equipment and its supporting ETE are purchased and managed separately. A major share of ETE is specified by a prime contractor, possibly without adequate consideration for logistic support systems and availability of the specified equipment. It has been estimated that well over 50% of the ETE

now in military inventories was acquired through prime contractors.* Central management of these assets within each Service should account for significant savings. In addition, it will foster the development of a well coordinated approach to the user of ETE in support of prime systems.

The office of the single manager in each Service would provide a clearing house for up-to-date information on industry resources for providing ETE and related supplies and services. The single manager would consult with systems program offices (SPOs) and other users concerning the most cost-effective approach to fulfilling a need for FTE over the anticipated life of the requirements.

In 1974, the Institute for Defense Analysis found that: "DOD appears to have no cost accounting system capable of providing data on the full life-cycle costs of any electronic subsystem. Full life-cycle costs include Research, Development, Test and Evaluation (RDT&E), Procurement, Operations and Maintenance (O&M), Military Personnel costs, other direct costs, allocable indirect costs, and depreciation or other measure of capital investment in support equipment and facilities. Maintenance costs and indirect costs in particular are very inadequately known from a cost accounting point of view. Moreover, there is often confusion as to the significance of the various reported costs because of inadequate or nonuniform definition of cost elements. As a result, cost estimation and cost-effectiveness tradeoffs are difficult at best and often impossible."**

The Electronics X report recommends development of a complete and uniform cost accounting system throughout DOD with emphasis on valid input data. This is a worthy long-range goal, but a more urgent need is to ensure that full consideration is given to significant administrative and indirect cost differentials associated with alternative means of acquiring the ETE required by the Military Services.

The total cost of preparing Military Specifications or purchase descriptions, soliciting bids or proposals, and performing acceptance inspections differs significantly among OTS ETE,

*Estimate based on figures supplied by Task Force industry representatives on their firms' sales to prime contractors in proportion to their sales directed to the Department of Defense.

**Electronics X--A Study of Military Electronics with Particular Reference to Cost and Reliability. Institute for Defense Analysis, January 1974.

modified commercial ETE, and ETE specially built to Military Specifications. In addition to direct costs expended in the process, the length of time from identification of need to delivery of an item can take a year or more especially if bid protests are encountered. In contrast to the long and costly process normally followed in making large purchases of consolidated requirements, only a one-page form is usually required to order OTS ETE that is available on indefinite delivery contracts (such as multiple-award Federal Supply Schedules).

Very often, time lags and high administrative costs incurred in acquisition and logistic support can offset the price savings achieved through the consolidated purchase of ETE built to Military Specifications. The lesser cost of acquisition of OTS ETE compared with that of modified or special ETE should be identified and used in making management decisions. The single manager would be responsible for establishing acquisition policies to assure full consideration of these factors. The evaluation would also include recognition of the potential for decentralization of procurement to achieve optimum use of indefinite delivery contracts, such as multiple-award Federal Supply Schedules and other simplified procurement techniques.

The DOD logistics system, including single management concepts, has been developed to provide support to military activities throughout the world in time of war and peace. In the purchase of OTS ETE, the single manager must evaluate the impact on the system of items which contain many parts that cannot be economically cataloged. Assurance of long-term availability of parts and service in support of military needs is an essential element of cost/benefit determinations.

To do his job, the single manager would require an inventory of all ETE in his Service. The inventory could be used to identify idle ETE for transfer to other operating agencies and thus reduce the need for new procurement. In addition, the inventory will provide information on the age of equipment in use and establish a basis for an orderly replacement program. The inventory will also provide more uniformity in establishing repair and calibration requirements.

The single managers would provide a focal point for the coordination of inter-Service use of calibration and repair facilities. This would lead to more effective consolidation or modernization of such facilities.

IMPLEMENTATION

- DOD should direct each Military Service to establish a single manager for ETE within each Service. The single manager should be given the responsibility for such functions

as: Budgeting for general-purpose ETE. Approving the use of general-purpose ETE and reviewing the use of special-purpose ETE for the support of prime systems. Reviewing measurement requirements used in keeping records on the repair and calibration of the general-purpose and special-purpose ETE needed to support prime system. Establishing procurement policies requiring the acquisition and support of ETE by the most cost-effective method consistent with the military requirement.

- DOD should issue a policy directive requiring single managers, heads of procuring activities (HPAs), and other procurement officers to include significant administrative costs such as specification writing, solicitation, and inspection in making cost/benefit analyses of alternative means of acquiring ETE.

- Procurement activities should implement the foregoing policy by making a one-time evaluation of significant administrative and indirect costs and develop standard rates reflecting the cost differentials associated with alternative means of acquisition. The resulting rates should be included in cost-effectiveness models and should be updated periodically.

MINORITY POSITION ON RECOMMENDATION 24

The following joint Navy/Air Force position was taken by Rear Admiral Fowler and Major General Nelson:

Recommendation 24 is impractical.

Rationale: Placing both general-purpose and special-purpose electronic test equipment under a single manager in each Military Service would require major reorganizations, changes in procedures and budgeting processes, and reassignment of responsibilities. In addition, requirements determination, allowance establishment, procurement, delivery, follow-on support, military readiness, and mission essentiality cannot realistically be the responsibility of a single manager.

Reword Recommendation 24 as follows:

Minority Recommendation 24. Place general-purpose electronic test equipment under a single ETE manager in each Military Service. The ETE manager shall also review and coordinate all special-purpose electronic test equipment acquisitions to maximize the use of off-the-shelf electronic test equipment.

Management

FOLLOWUP ON TASK FORCE RECOMMENDATIONS

PROBLEM

In many cases, the recommendations of task groups and special study efforts are not implemented due to the lack of a program to assure understanding, delayed consideration by those affected, insufficient monitoring, and resistance to change among those affected.

SOLUTION

Recommendation 26. Establish a program to monitor implementation of accepted Task Force recommendations. Designate a specific person in the Department of Defense to manage the program.

Recommendation 27. Assemble the Task Force periodically in 1976 to evaluate results being attained through implementation of its recommendations.

Recommendation 28. Provide for feedback from industry as one means of evaluating how effectively accepted recommendations are being implemented.

ANTICIPATED BENEFITS

Implementation of these recommendations would:

- Foster early realization of savings and other benefits.
- Assure that accepted Task Force recommendations are given sufficient visibility and full consideration.
- Give impetus to prompt implementation of recommendations that prove valid and feasible.
- Tend to ensure that the purposes of the Task Force will be fulfilled as rapidly and effectively as possible.

BACKGROUND/DISCUSSION

The work of any advisory group may prove to be futile and therefore a waste of scarce time and money when its recommendations are filed and forgotten. Yet, this happens all too frequently, even when implementation of the recommendations could

save large sums of money and improve Government operations. Unless there is a formal means for monitoring the action taken on such recommendations, they tend to fall through the cracks. Delays in implementing recommendations occur because:

- Officials who could put them into effect fail to notice them or do not have time to follow up.
- The recommendations are put aside for further study.
- Reorganization impetus is lost because of personnel turnover or resistance to change.
- Jobs may be in jeopardy.
- Sometimes the recommendations cannot be applied within the present system and must be revised to accomplish their intent.

The intent of the foregoing recommendations is to establish a means for followup by those who originated the recommendations to help keep the accepted recommendations alive. It is important to publicize what has been done and how implementation of the recommendations is progressing. The attention of the general public is now focused on the need to improve Government management and thereby reduce costs wherever possible. In view of this awareness, the public and the ETE industry would welcome reports on Department of Defense progress in responding to Task Force recommendations that have been accepted by DOD.

IMPLEMENTATION

- Amendment of the Task Force charter so that the group will be available for followup meetings in 1976.
- Designation by the Deputy Secretary of Defense of an office or individual to serve as a focal point for monitoring implementation of Task Force recommendations.
- Feedback arrangements should be established whereby industry may advise OSD how the changes are working.
- Publicize the accepted recommendations as well as the procedures by which industry feedback will be sought.

Appendix A



ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

INSTALLATIONS AND LOGISTICS

MEMORANDUM FOR The Chairman, Defense Science Board
Attention: Dr. Buchsbaum

SUBJECT: General Purpose Electronic Test Equipment

In accordance with the preliminary agreement reached between you and Jack Gansler recently, our staffs have been working with John Fluke on the development and organization of a Task Force on General Purpose Electronic Test Equipment. You will recall that this effort has been initiated as a result of Secretary Clements' agreement regarding the need for such a study wherein a group would examine the greater use by DoD of privately developed, commercially available off-the-shelf test equipment with objectives of economy and increased reliability.

A copy of the task statement, which describes the objectives and operation of this Task Force, is enclosed for your information and concurrence. In the meantime, we have asked that John Fluke continue the organization of the Task Force and plan the initiation of business meetings.


MALCOLM R. CURRIE
Director of Defense Research
and Engineering

Date: 25 October 1974


ARTHUR I. MENDOLIA
Assistant Secretary of Defense
(Installations and Logistics)

Date: 29 October 1974

Enclosure
Task Statement

cc: Mr. Fluke
Mr. O'Donohue, AD(Planning), ODDR&E
Mr. Scott, OAD(Planning), ODDR&E

TASK STATEMENT

ELECTRONIC TEST EQUIPMENT TASK FORCE

- References:
- (a) DoD Directive 5030.13, Regulations for the Formation and Use of Advisory Committees, 20 April 1962
 - (b) Defense Science Board Charter, filed 8 January 1973
 - (c) Deputy Secretary of Defense Letter, 30 July 1974, to John M. Fluke
 - (d) Assistant Secretary of Defense (I&L) memo, 24 July 1974, Electronic Test Equipment Committee, to Asst. Secretaries (I&L) of Army, Navy, and Air Force

1.0 GENERAL

There is hereby established the Electronic Test Equipment Task Force whose purpose, objectives and membership are defined as follows:

2.0 PURPOSE

The purpose of the Electronic Test Equipment Task Force shall be to examine the greater use by the Department of Defense of privately developed, commercially available off-the-shelf electronic test equipment, including modifications thereof, with the goal of achieving economy and reliability benefits for the several armed services and to recommend policies and procedures which will maximize these benefits.

3.0 OBJECTIVES

The objectives of the Task Force are generally described as follows:

- 3.1 To investigate the feasibility of increased use of the above-mentioned off-the-shelf electronic test equipment for all applications where this equipment is deemed suitable.
- 3.2 To investigate the overall economies of acquiring and using the above-mentioned off-the-shelf test equipment to maintain and operate DoD electronic equipment.

- 3.3 To investigate the greater use of commercial support and service to reduce logistic costs such as, but not limited to, the following:
- 3.3.1 Evaluate spare parts versus spare assemblies of electronic test equipment to improve readiness for service at lowest overall cost.
 - 3.3.2 Investigate the economy and suitability of commercial warranties and product services and support and training aids.
 - 3.3.3 Investigate the potential for reducing the services' technical manpower needs.
 - 3.3.4 Investigate the opportunity to reduce capital expenditures and facilities.
- 3.4 To investigate current procurement procedures and regulations which may need change or clarification such as, but not limited to, the following:
- 3.4.1 Maximum use of bid samples (demonstrators) and similar product evaluation techniques.
 - 3.4.2 Investigation of practices as they relate to procedures.
 - 3.4.3 Investigate fiscal practices relating to procurement.
 - 3.4.4 Recommend legislative action if appropriate.

4.0 MEMBERSHIP

The Electronic Test Equipment Task Force shall be comprised of the following membership:

- 4.1 A high level executive from OSD, with responsibility and authority to implement the recommendations.
- 4.2 One flag level representative from each of the several Services responsible for, and an authority on, the using Service's needs and with the responsibility and authority to implement the recommendations.
- 4.3 A flag level representative responsible for, and an authority on, procurement procedures from DoD.
- 4.4 A single representative from not more than eight established commercial suppliers or users of electronic test equipment of high level and authority in their respective organizations and distinctly knowledgeable with respect to the Services' electronic test equipment needs.
- 4.5 A chairman selected by the OSD.
- 4.6 The Task Force, in light of the foregoing, shall be limited to fourteen members plus a chairman.
- 4.7 Any or all of the members may invite to any portion of Task Force meetings such others as he may desire which he believes will be useful in contributing to the work of the Task Force. Further, each member may use such others as required in pursuing the work of the Task Force.
- 4.8 Invitations to membership shall be issued by the Defense Science Board (DSB).

5.0 OPERATIONS

The Task Force shall meet at frequent intervals with the view of pursuing the assigned tasks as expeditiously as possible. Meetings shall normally be open and shall conform to an agenda prepared at the conclusion of the previous meeting except the first meeting whose purpose shall be to decide on the specific initial efforts of the Committee and the necessary information research efforts required.

6.0 RECOMMENDATIONS OF THE TASK FORCE

The recommendations of the Task Force shall be reported orally and in writing to the Deputy Secretary of Defense at a time and to the extent that he may direct.

7.0 TERMINATION

The Task Force shall terminate one year after the date of approval of this Task Statement or sooner if its mission is completed, or unless prior approval for its continuation is obtained.

Appendix B

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Appendix C

ACRONYMS

AFLC	Air Force Logistics Command
AID	Aerospace Industries Association
ARINC	Aeronautical Radio, Inc.
ASPR	Armed Services Procurement Regulation
ATE	Automatic test equipment
ATLAS	Abbreviated Test Language for Avionic Systems
BNOE	Brand name or equal
CONUS	Continental United States
CRF	Calibration and repair facility
DATELS	Defense ATE Language Standarization
DCSC	Defense Construction Supply Center
DESC	Defense Electronics Supply Center
DGSC	Defense General Supply Center
DISC	Defense Industrial Supply Center
DOD	Department of Defense
DPDA	Defense Property Disposal Activity
DSA	Defense Supply Agency
D&F	Determination and finding
DSC	Defense Supply Center
EIA	Electronic Industries Association
ETE	Electronic test equipment
FCA	Field calibration activity
FECL	Field electronic calibration laboratory
FPR	Federal Procurement Regulations
GAO	General Accounting Office
GPETE	General-purpose electronic test equipment
GSA	General Services Administration
I&L	Installations and Logistics
JLC	Joint Logistic Commanders
MIL SPEC	Military Specifications

MOL	Maximum order limitation
NAVELEX	Naval Electronic Systems Command
NSIA	National Security Industrial Association
NSN	National Stock Number
OCONUS	Outside Continental United States
ORTEM	Optimum Reliability through Effective Management
OSD	Office of the Secretary of Defense
OTS	Off-the-shelf
O&M	Operation and maintenance
PIL	Preferred Item List
PME	Precision measurement equipment
PMEL	Precision measurement equipment laboratory
PTD	Provisioning technical documentation
QPL	Qualified Products List
QSL	Qualified Source List
R&D	Research and development
RIW	Reliability Improvement Warranty
SBA	Small Business Administration
SPEC	Specification
SPO	System Program Office
STD	Standards
USC	United States Code
VA	Veterans Administration