

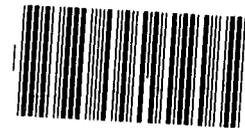
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Report to Commander, U.S. Army
Materiel Command

February 1987

ARMY AUTOMATIC DIAGNOSTICS

Observations on Army Test Program Sets



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**National Security and
International Affairs Division****B-219822**

February 24, 1987

General Richard Thompson
Commander, U.S. Army Materiel Command
Department of the Army

Dear General Thompson:

The process of developing and fielding complex weapon systems within the Army has generated the need for computer-controlled automatic test equipment (ATE) that can provide fast and accurate fault diagnosis of failed systems. As weapon systems increase in complexity, reliable automatic testing is crucial to sustain operational readiness in a cost-effective manner. Test program sets (TPS) are an integral part in achieving this goal.

TPS are used in conjunction with ATE to detect and isolate failures within a component being tested. Generally, TPS consist of (1) a software test program; (2) test accessories such as interface connection devices, load card assemblies, cables, power supplies, and cooling devices; (3) documentation that includes technical manuals and engineering data required for TPS modification; and (4) integrated logistics support of the test accessories.

We have completed a survey of the Army's management of TPS. Our objective was to determine whether the Army is providing adequate TPS support in a cost-effective manner. Our work was primarily done at the Communication and Electronics Command, Army Materiel Command, and the Tobyhana Army Depot. We interviewed personnel associated with TPS and reviewed appropriate documents. Our work was performed from July 1986 to December 1986 in accordance with generally accepted government auditing standards.

We found that the Army has experienced problems in developing, acquiring, and fielding TPS; however, it has initiated actions or developed proposed solutions to address most of these problems. We believe that these actions have merit and are steps in the right direction. During our survey we made certain observations that we believe directly relate to the crux of the issues that must be addressed and resolved if the TPS program is to achieve its intended goals and objectives. These observations, which are briefly summarized below, concern the importance of TPS implementation and management plans, and development of a TPS cost model to assist managers in making decisions. Overall, we believe

command emphasis will further the Army's efforts as it develops and implements its TPS policy and procedures.

Importance of TPS Implementation and Management Plans

Each of the six major subordinate commands has been tasked to establish a TPS Center, which would assist weapon system project managers in all TPS efforts and serve as a field monitor for the product manager-TPS (PM-TPS) to ensure compliance with Army TPS policy. An important aspect of this effort calls for each Center to develop a plan that describes how the command will implement the Army's TPS program

It was envisioned that the implementation plans would be operational by mid-March 1985. However, as of September 1986, of the six centers that had submitted their plans for review and approval, only one had been approved by the PM-TPS as meeting all the criteria for an effective implementation plan.

The Army's TPS policy also provides that a TPS management plan be prepared for each weapon system requiring TPS and that the plan be approved by PM-TPS before the system enters full-scale engineering development. (As of August 1986 only one plan had been submitted for review.) Among other things, the plan is to identify the program manager's action plan and funding levels for developing, acquiring, and maintaining the weapon system's TPS. The importance of the management plan is that it can provide the basic guidance and framework to aid project managers in developing the TPS to ensure that the sets are available when the systems are fielded.

While the management plan has merit, the plan in and by itself will not resolve many of the TPS problems. The key ingredient is cooperation and coordination between the system manager and the TPS manager.

Development of a TPS Cost Model

The Army is developing a TPS cost model to aid in the decision-making process. According to Army officials, the model at this time has limited utility because the cost information in the data base is incomplete and outdated. We were told that in the past TPS cost data was not accumulated, and while this is now required, it will take time to accumulate sufficient data to develop an adequate cost model. As a result, Army management does not yet have a basis for determining costs to develop, operate, and maintain a TPS over its life-cycle. This, in turn, can affect trade-off decisions, such as

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- whether a TPS should be developed given the cost of the unit under test, the units' expected failure frequency, and the cost of the TPS;
 - whether to have the TPS developed in-house or by a contractor; and
 - whether to develop the TPS concurrent with the weapon system (recognizing that design changes will add to TPS development costs) or to wait until the design stabilizes and incur additional costs associated with interim contractor support and spares.

We would be glad to meet with you or your staff to discuss any of these matters. If you have any questions or would like additional details, please call Mr. Mark Gebicke, Associate Director, at (202) 275-4133

Copies of this report were sent to the Secretaries of Defense and Army.

Sincerely yours,


for Henry W. Connor
Senior Associate Director

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