EVALUATION OF AN AUTOMATIC TEST SUPPORT SYSTEM
AT AN ARMY GENERAL SUPPORT MAINTENANCE ECHELON
Randall R. Burchacki and Major Trexler
Army Product Manager — Automatic Test Support Systems

Abstract
This paper evaluates the deployment of an Automatic Test Support System at the Army's General Support maintenance echelon. Because of data being unavailable to the writers at time of printing, an addendum to this report will be provided at Autotestion '78. At that time, the effects of the ATSS on present Army logistics concepts will be explored in detail. Recommendations and conclusions will be presented for utilisation of future ATSS. Ideas based on field experience at the GS shop will be developed for Automatic Test Equipment (ATE) at other maintenance echelons (i.e., Organizational, Direct Support (DS), and Depot). The effect of ATE on operational readiness will be studied.

I. Introduction
One measure of the military services effectiveness is its operational readiness; i.e. the ability of that system to perform a mission when demands for its use arise. The direct lifeline for operational readiness is the logistic support system. Presently, the Army logistics system is struggling to support equipment that was fielded in the 1960's. With the annual addition of complex battlefield systems, equipment support will be impossible without a change to the present system. Because of the inherent complexity of recent fielded systems, the Army is looking toward Automatic Test Equipment (ATE) to solve its field repair problems. Unlike the use of ATE at a Depot or Commercial facility, many inherent problems exist in introducing such a system into the field Army. The purpose of this report is to evaluate these problems and use lessons learned so that ATE can be effectively deployed at the different maintenance echelons. The means for this evaluation is an Operational Test (OT) that the Army conducted on an Automatic Test Support System (ATSS) for the General Support Maintenance Echelon. The OT was performed at Army field sites in West Germany during the period 1 Feb 78 thru 31 Jul 78. The primary objectives to be analyzed during this test are as follows:

a. To assess the impact of using the ATSS at the GS shop on the maintainability, availability and supportability of selected electronic equipment.
b. To assess the capability of Army field PCB repair using an ATSS.
c. To assess training, human factors, and RAM requirements of an ATSS in an Army field environment.
d. To assess operational ability of an ATSS to function in a mobile configuration.
e. To provide information on repair parts usage when ATs is employed at the GS maintenance level.
f. To evaluate the current manual methods of repair as compared with ATS assisted repair in a GS maintenance shop environment.

II. Test Description
A. System Composition
The GS/ATSS consists of the Automatic Test Equipment (ATE) AN/USM-410 and the Electronic Repair Facility (ERF). The AN/USM-410 and the ERF are deployed in two semi-trailer, electronic, 30-feet vans whose mission is to provide test and repair capabilities for selected Printed Circuit Boards (PCB's) power supplies and Line Replaceable Units (LRUs) at selected GS facilities. Both vans are environmentally controlled, contain shock and vibration restraints, and require a total of two 30kW, 60Hz generators (one a spare). The AN/USM-410 is a computer controlled automatic test equipment capable of automatic testing and fault isolation of electronic equipment, assemblies, sub-assemblies, and components. The testing and fault isolation is performed via a software test program which directs the AN/USM-410 to (1) provide the proper stimuli to the unit under test (UUT); (2) make measurement of responses from the UUT; (3) determine the acceptability of the UUT; and (4) fault isolate within the UUT. Physically, the AN/USM-410 is configured in standard racks and consists of a computer rack, UUT station consisting of two side-by-side half racks with dedicated interface panel and work surface on top of the two half racks, power supply rack, programable interface...
unit rack, tape unit, CAT terminal and high speed printer. The measurement/stimulus range of the ATE is DC to 5000Hz.

The second van contains a repair station in which the field repair of PCB's, modules and larger assemblies will be performed. The RF contains the required benches, cabinets, tools, and bench test equipment for carrying out its repair mission. PCB repair will be accomplished with the PAC3 Soldering Kit. A quality control station is included for final inspection of the repaired equipment.

B. Personnel Utilized

The GS/ATSS during the test period was operated by a team of nine (9) Army enlisted personnel. The team consisted of a system supervisor (NOS 31W30), two operators (NOS 35B20), four repairmen (NOS 31L), a quality assurance man (NOS 31L0), and a supply clerk (NOS 69P). Organization maintenance on the system was performed by the two operators. Intermediate maintenance was accomplished on the ATE by an on-site contractor representative.

In addition to the above, three enlisted personnel from the United States Army Air Defense Board (USAADB) performed the data collection task for the test. A report of the collected data will be published by USAADB on 1 Nov 78. Evaluation of this data will be included in an addendum to this initial report at Autotestcon '78.

C. Test Location/Workload

The GS/ATSS was deployed at selected GS shops in West Germany. The GS shops were the 881st Maintenance Battalion in Hanau, West Germany and the 71st Maintenance Battalion in Nuremberg, West Germany. Additionally, the ATSS spent two months at a Special Repair Activity (31A) in Pirmasens, West Germany and one month as a GS contact team in Ansbach, West Germany.

The workload at the different locations consisted of test and repair of the AN/MSQ-12 and AN/PRC-77 7F radio series. PCB's from the AN/TSQ-73 missile minder system and the AN/VRC-12 radio were also serviced.

III. Test Evaluation

As mentioned in the Abstract, the test evaluation with conclusions and recommendations will be provided as a handout during the Autotestcon seminar.