

Sustainment of Army Systems

PROBLEM/OBJECTIVE

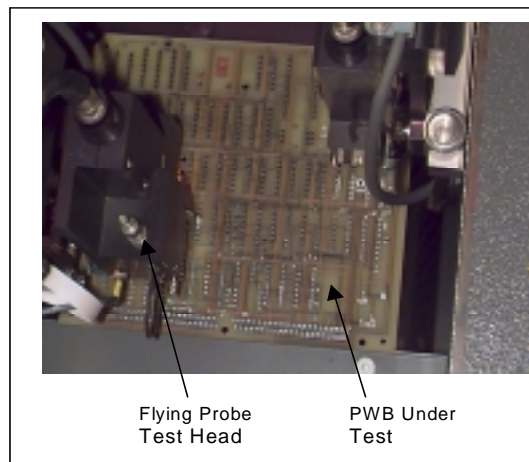
This project is to demonstrate and implement technology to improve the Army's organic capability to meet electronic printed wiring board demands. The objective was to develop and demonstrate an automated reverse engineering system to nondestructively extract the information necessary to remanufacture multi-layer PWAs and demonstrate the feasibility of fixtureless testing to accelerate the automated testing and remanufacture of PWAs.

ACCOMPLISHMENTS/PAYOFF

Process Improvement: The key component of the PWB project is called a "flying probe tester" which measures conductivity and capacitance for all possible interconnects on a known good board in a few hours. The number of measurements can be 300,000 or more depending on complexity. A small business, Integri-Test Incorporated, validated a patented flying probe capability on two bare PWBs from Tobyhanna, each having over 1000 points and 240 nets. Over 85,000 test operations were conducted to generate a net-list useful for remanufacturing. A net-list is the set of interconnections between points that are visible on the surface of a printed wiring board (PWB). The net-list is used as a design input for manufacturing equipment as layout patterns on the signal layers comprising the board. Industry acceptance is evidenced by the recent implementation of similar equipment by Harbor Electronics, Santa Clara, CA, to provide an industry service to test high technology circuit boards.

Industry Acceptance: The ManTech effort was initiated to provide Tobyhanna the capability to meet a requirement not currently filled by the PWB industry. Tobyhanna worked with equipment vendors who were supportive of this effort.

Implementation/Tech Transfer: This task has successfully demonstrated printed wiring board reengineering technology at Tobyhanna that helps them produce new boards for obsolete systems and tests the PWAs for functionality and compliance to specifications. Turnaround and throughput for reverse engineering of PWAs for Army communication and sensor systems have been enhanced. Tobyhanna's first application was



for a ruggedized PC for ground and airborne radio systems. Five PWBs were manufactured in 2 weeks at 90% of the original processing cost. The systems impacted at this time are the Army's Mobile Subscriber equipment, AH-64 Apache, UH-60 Blackhawk, Stinger Missile, Guardrail, and the AN-TTC-39 Ground Communication system. These systems all have PWB manufacturing and PWA requirements specific to this technology. End user's include anyone with printed wiring board and PWA remanufacturing needs.

Expected Benefits: DOD can leverage industry capabilities, modifying that capability for DOD unique requirements, and achieving an early return on investment. This project will create more affordable weapon systems, with a higher capability to reach increasing readiness requirements. Costs to reverse engineer PWAs for electronic systems will be reduced up to 90% and throughput increased 100%.

TIMELINE/MILESTONES

Start Date: February 1998
End Date: September 2000

FUNDING

ManTech Funding:
Army MANTECH Funding: \$1.375M

PARTICIPANTS

Integri-Test Incorporated and GenRad Corporation