

The following technical paper abstract information was recently submitted in connection with session DOD103,Electrics, Electrical

Offer Number: 14DOD-0013

Paper Title: MOBILE INTELLIGENT MULTI-METERS Tracking health of electrical sub-systems over lifecycle AIR/LAND/NAVAL vehicles

Authors:

Alain Lussier
Solavitek

Quebec
(450)678 3568
alussier@thsi.ca

Frank Zahiri
Warner Robins AFB
(478) 327-4127
feraidoon.zahiri@us.af.mil

Abstract: Background:

The "electronic" era has expanded to all types of vehicles (air, land, sea). This has resulted in electrical sub-systems becoming more complex and critical to the overall performance of a vehicle throughout its lifecycle.

The innovation we propose is an advanced portable electrical test platform that was designed to support the production and maintenance of these electrical sub-systems over the lifecycle of a vehicle.

While great advances were made in software and tools to improve the manufacturing of electrical wiring harnesses, the role of large automated circuit analysers have been limited to quality control of new harness production assemblies and OEM final vehicle assembly lines.

As fleet of vehicles enter service, the electrical technicians must rely on their expertise to diagnose complex electrical sub-system problems using handheld meters that provide limited capabilities.

Technical solution:

New technology has been developed based on a series of innovations that essentially provides technicians with a simple to use diagnostic tool that drastically improves their capability to quickly find and correct an electrical sub-system fault. The technology, called UN-ATE (Universal Advanced Test Equipment), consists of a laptop/tablet controlling a network of test units that can be deployed at various locations on the vehicle under test via a family of generic e-socket interface connectors. Proprietary software allows easy programming to specific subsystem protocols. The system's architecture follows common standardized processes that can easily be transferred to any

vehicle platform, providing electricians with an array of automated test capabilities and vehicle historical information allowing rapid diagnosis of complete sub-systems over time.

On the manufacturing side, UN-ATE can be rapidly configured to learn electrical mapping and then use that information to provide the operator with all the information required to assemble and validate the configuration of electrical sub-systems. This is easily done on new wiring installations or modernization of legacy vehicles. The system also allows the skilled electrician to “reverse engineer” and evaluate existing configurations of legacy wiring of older subsystems not being replaced or modernized.

On the maintenance side, UN-ATE can rapidly be configured to validate the integrity of critical sub-systems. It can be deployed to monitor the ageing fleet performance, using fleet baseline values and tracking tests results that identify open, shorts, degradation and intermittent faults degradations over time.

Benefits:

A Proof of concept demonstration conducted on the C130 antiskid braking and engine instrument at Warner Robins ALC under a CTMA (Commercial Technologies for Maintenance Activities) collaborative project confirmed:

- 75% cost savings and turnaround time to build TPS/interface cables reduced from 9 months to a few days
- Agility to provide both D-level and O-level capabilities at 50% lower operating costs than conventional methods.

Commercial aircraft industry experience has shown:

- Turnaround time to troubleshoot airliners consistently in the range of 45 minutes per event vs. several hours.
- Complex cases that used to required 3 days were solved in 3 hours eliminating flight rescheduling
- Heavy maintenance operations are now scoping all aircraft for top 7 reliability issues on day 1 in 3 hours and fixing deviations found before day 5.
- All aircraft data are used create fleet/aircraft specific preventive programs.
- Better control over the practice of removal of components without a complete diagnostic
- Scope of work is expanding to all aircraft platforms and multiple sub-systems