Advanced Mobile Universal Electrical Tooling (AMUET)

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Problem Statement

• Over half of all maintenance actions result from electrical systems anomalies
• Finding these anomalies is difficult due to increasing complexity and extremely manpower intensive
• ATE has been developed to address issues but can be costly and sometimes cumbersome to handle (on the flight line)
• Alternative hand held meters are more labor intensive and less effective in finding and tracking systemic issues
Solution to Problem

• Evaluate a new electrical testing technology able to quickly detect electrical wiring anomalies both at the Depot and O level, track results, and offer analytics for prognostics of the fleet over time

• Technology must be agile, lightweight, easy to program, and less costly than conventional ATE

• One man, 45 minute scan is the objective

• AMUET met the requirements, but must be proven to perform
Technical Approach

• Objective: Expand testing (beyond Proof of Concept completed in Phase I) of a new advanced wiring tester (AMUET) on multiple aircraft (C5, C130, CV22) electrical subsystems; validate benefits via a BCA
• Project Funding: $350K + $85K = $435K
• Funding Source: FCT (Foreign Comparative Testing Office - OSD)
• FCT Mission: Test technologies of our foreign allies that have a high Technology Readiness Level (TRL) to satisfy defense requirements more quickly and economically
• Project Timing: 12-18 months (starting Feb, 2015)
Project Status

- Phase I complete – two C130 systems Proof of Concept, abbreviated BCA
- Phase II Subsystems identified for C5, C130, CV22 (Hurlburt)
- AMUET H/W & S/W for C5 and C130 completed, ready for test
- Cybersecurity/IATT approval requirement identified (Sept 2015)
- CS/IATT approval successfully obtained (Nov, 2016)
- Testing resumed on C130 - 3 tests successfully completed (Mar, 2017)
- Obtained FDO (Foreign Disclosure Office) approval to proceed with C5 test plan
- Negotiating with AFSOC on aircraft and subsystem for AMUET testing – extended test plan (6 month) requested
AMUET Testing Observations
AMUET C-130 Testing

- **22-Feb-17 Test Event:**
  - Participants: Combined team from Solavitek, NCMS, USAF SPO, USAF AMXG, AFSOC, and MERC
    - Tested 3 subsystems on C-130
    - Recorded Times were for the duration of taking AMUET out of/returning to its cases (i.e. setup, test, takedown)
    - Anti-Skid subsystem test (both sides) complete in 42 minutes
    - Fuel Quantity subsystem test (#4 engine only) complete in 8 minutes
    - Intercom subsystem test (pilot to copilot) complete in 13 minutes

- **Future Test Event(s):** AFSOC-selected subsystems on C-130 at Hurlburt
  - Fuel Quantity, Autopilot, Radar Systems
AMUET C-130 Testing

- Possible process-improving features noted when utilizing the AMUET:
  - Small, portable form factor
  - Speed & ease of visual training, setup, and testing
  - Wide range of tester and wiring troubleshooting capabilities including physical location(s) of open, shorts and intermittent faults
  - Fewer technicians required than needed for USAF Standard Tester
  - Short lead time, cost and perhaps less complex execution for new subsystem TPS
  - When networked and testing data reposited, aircraft and/or fleet wide tracking/trending is available
AMUET cases open, people for scale

1. C130 interface cables (Fuel, ICS, A-skid)
2. 5 Testers
3. Laptop

AMUET cases closed
Technology Deployment

• Air Force (Warner Robins, AFSOC)
• Canadian Air Force
• NAVSEA
All-in-One Tooling for CANADIAN Air Force

MODERNIZATION
- Production tool
- Accelerates installation and QC
- Manhours savings of 25%-35%

O-LEVEL MAINTENANCE
- Advanced Mobile Troubleshooting
- Fix it right the first time
- Improves readiness by 40%

D-LEVEL MAINTENANCE
- Preventive Maintenance Programs
- Avoids random electrical failure
- Improves readiness by 25%

Canadian Air Force NETWORK
Wireless Tablet
Wireless Test box unit (TBU)
Interface cable
EWIS - Electrical Wiring Interconnect System

Solavitek Inc.
January 2017
AMUET in Commercial Aviation

AMUET on the flightline

Avionic bay

Test time: 20 minutes
AMUET in Naval application

- Accelerate production and sustainment
- Agility of Handheld, Power of ATE
AMUET Testing Results - February 2017

- Confirmed AMUET wireless performance in a manufacturing environment aboard (LCS 14)

  1. Range of wireless from mission bay down into the engine compartment with computer at the hatch to the engine compartment
  2. Performance ~300 feet and multiple platforms and deck levels
  3. Over 50 people working on deck while tests performed within minutes
AMUET performed 100% in all aspects - SUPSHIP involved

1. Range of wireless full length of mission bay
2. Tested a “Sold” system and found an issue
   - Issue was masked due to type of testing performed
3. Over 50 people working on deck while tests performed

AMUET Testing Results - February 2017

- Confirmed AMUET wireless performance on manufacturing environment on ship circuits (MOV) aboard LCS 14
Overall Benefits

AMUET is ready for prime time!

- Achieving one man, 45 minute test per electrical subsystem offers great potential for maintainers -- reduces cycle time, increases asset (aircraft, ship, vehicle) availability

- Cost and time savings to create TPSs (Test Program Sets), build cabling and connectors expands ATE capabilities to do more with less

- Technicians appreciate size, weight and agility of AMUET

- Capability to track and analyze performance (by unit/fleet) – key element to achieving CBM+
Project Team Participants

- Robins AFSC/EN
- C5/C130 SPO Engrg
- AFSOC (Hurlburt AFB)
- Robins ATS
- Solavitek (Technology Provider)
- NCMS
- MERC (BCA)
- Aircraft AO SCARs
- Foreign Comparative Testing (FCO)