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 (ie. 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

AMUET cases open

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

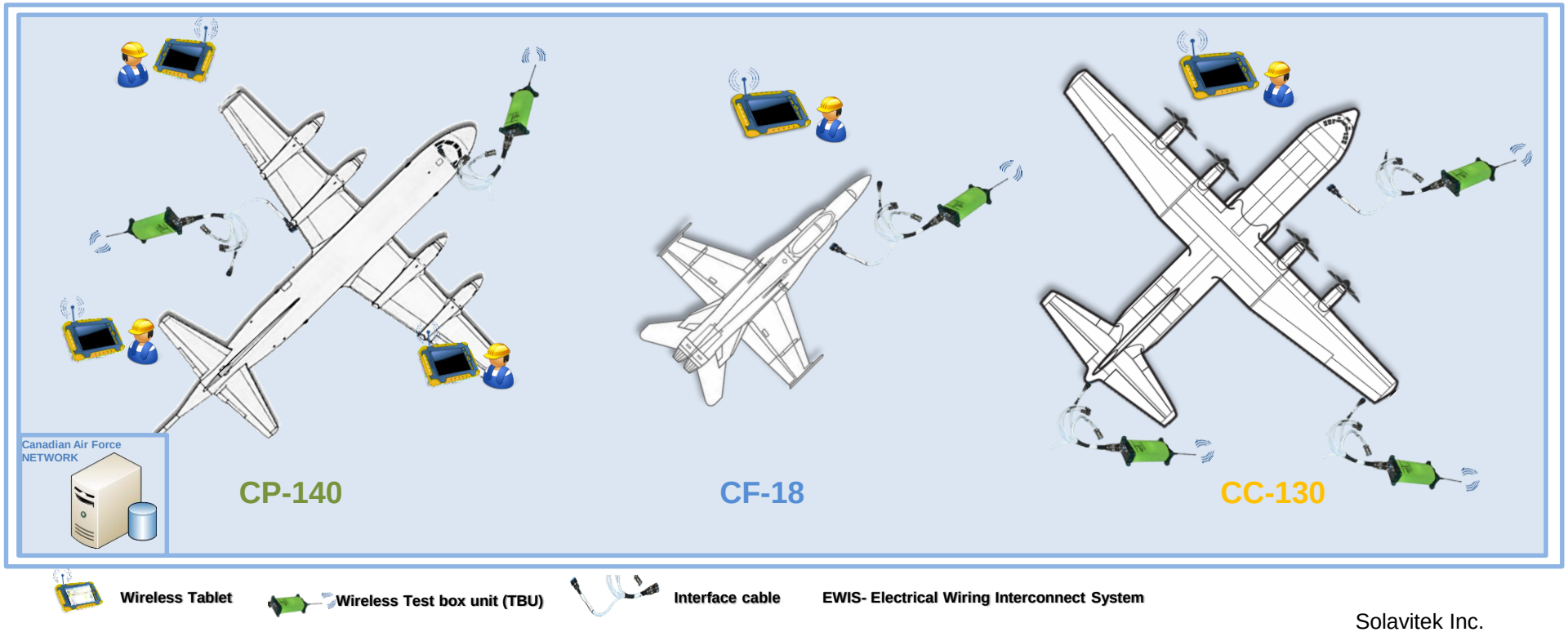
- Advanced Mobile Troubleshooting

✓ Fix it right the first time
✓ Improves readiness by 40%

D-LEVEL MAINTENANCE

- Preventive Maintenance Programs

✓ Avoids random electrical failure
✓ Improves readiness by 25%



Solavitek Inc.
January 2017

AMUET in Commercial Aviation

Flaps Wing tip Brake

AMUET on the flightline

Avionic bay

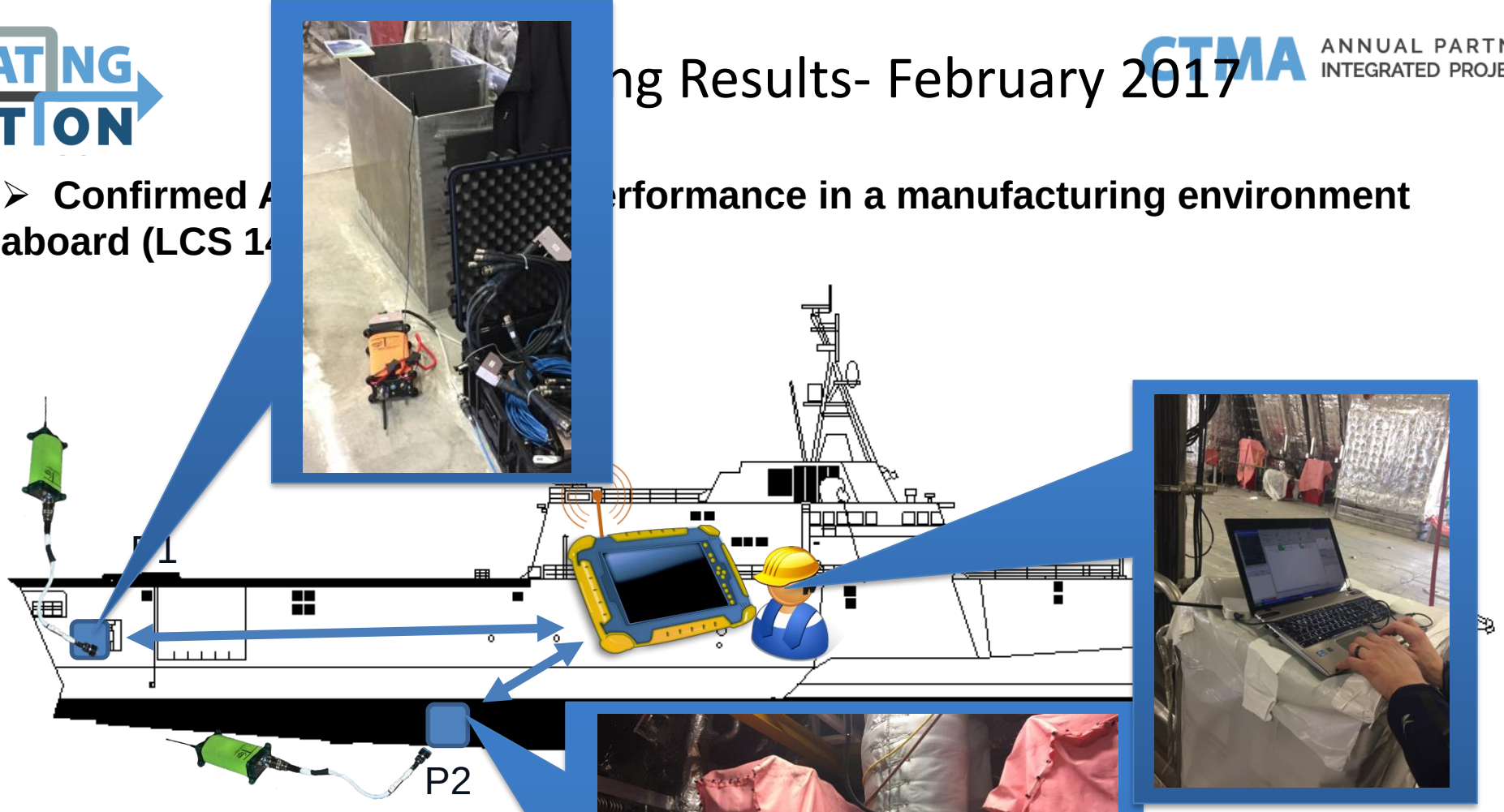
Test time: 20 minutes

AMUET in Naval application

- Accelerate production and sustainment
- Agility of Handheld, Power of ATE

ng Results- February 2017

- **Confirmed A erformance in a manufacturing environment aboard (LCS 14**

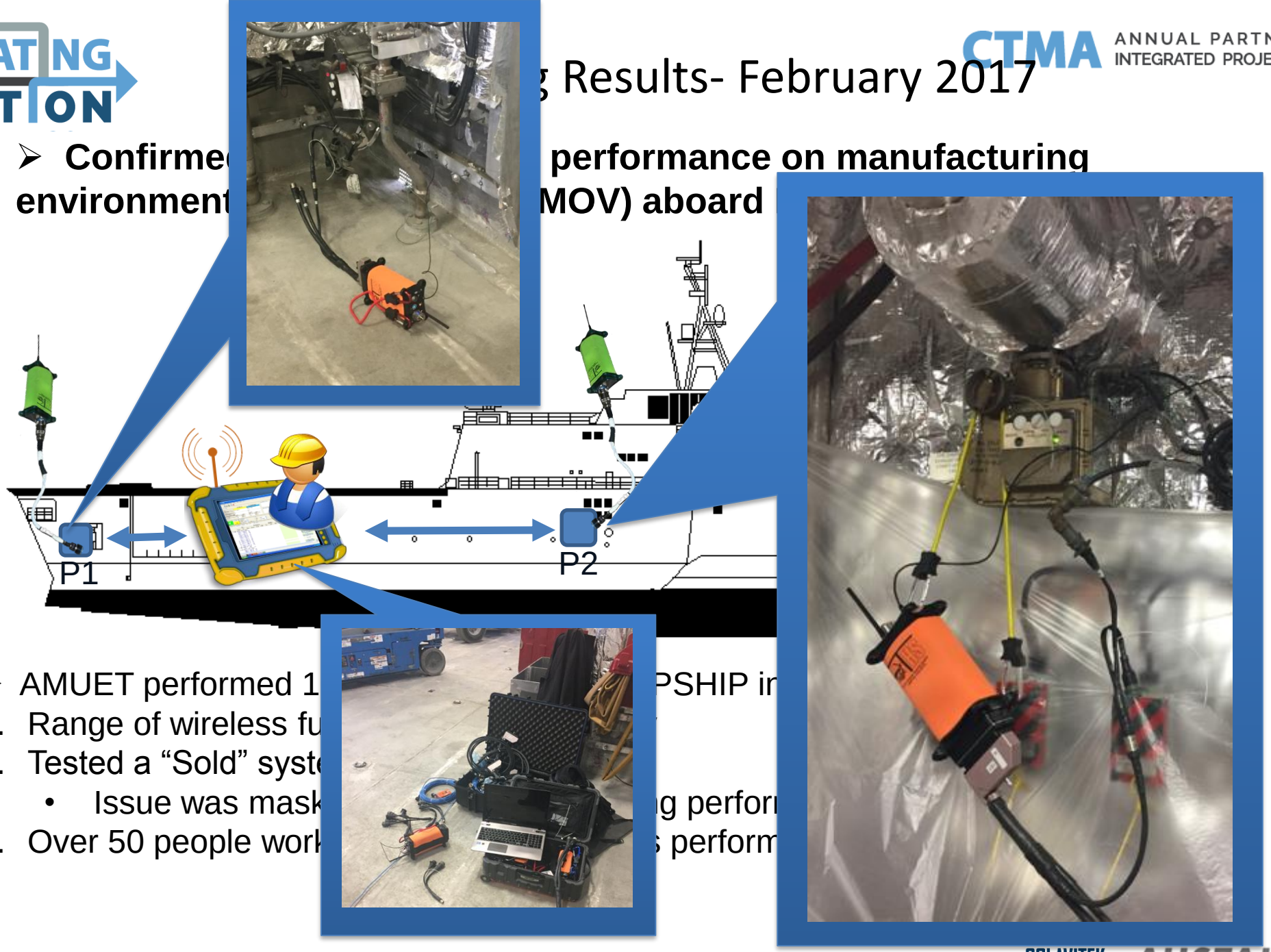


- AMUET performed 100% in all ental"

1. Range of wireless from mission rtment with computer at the hatch to the en
2. Performance ~300 feet and mu
3. Over 50 people working on dec nutes

g Results- February 2017

- **Confirme performance on manufacturing environment MOV) aboard**



- AMUET performed 1 PSHIP in
1. Range of wireless fu
2. Tested a "Sold" syste
   - Issue was mask g perfor
3. Over 50 people work s perform

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)