Aeromation Corporation

- Provides Manned Aircraft for Electronic System Testing
- Patrick Harris, President / Owner
  - Formerly, System Integration Engineer
    - LockheedMartin, Raytheon, Learjet
    - Radar Systems, Avionics
  - Aircraft available include:
    - Pitts S2 (9g, 180 kts, 200lb useful load, ceiling 21k)
    - Cessna T310R (3.5g, 220 kts, 1000lb useful load, ceiling 27k)
    - Eclipse 500 (3.5g, 370 kts, 1000lb useful load, ceiling 41k)
    - Fairchild SA-226T (3.5g, 265 kts, 3500lb useful load, ceiling 31k)
      - Civil variant of C-26

Aeromation is a Small, Veteran-Owned, Systems Engineering Business
A Perspective of Airborne Radar T&E Based on Experience with ARPDD

- Lab, Factory, and Depot Module Testing
  - Noise figure
  - Third order intercept
  - Intermodulation
  - Phase linearity, Missing Codes
  - Power, Compression Points
  - Near field testing of arrays
    - Test coverage is very good

- Airborne Radar I&T
  - Distance to detect, known RCS ground mounted targets
  - Imaging (ISAR) resolution
  - Time to detect pop ups
  - System test coverage can be very effective with modest capital outlay for range operations

Effective Methods are in Place to Test and Evaluate Airborne Radar Systems
A Perspective of Surface Radar Testing Based on Experience with DD(X) / Aegis

• Lab, Factory, and Depot Module Testing
  – As in the airborne case, test coverage is very good

• Ground based radar I&T
  – Track known RCS balloons
  – Target towers, with delay lines, mixers
  – Track N targets
  – Engage and destroy a single target
  – Detection performance in large part by analysis

• Gap in test coverage for ground based radar systems.
  – Can module test, systems analysis and system performance be correlated?
  – Special designed airborne equipment may close the gap at a reasonable cost

Air Defense Radar Testing may Benefit from the Use of Towed Airborne Targets
Missionized COTS target tow aircraft
- Three <4m² RCS targets in tow
- 80-220 Knots
- 1k to 27k feet, LOS 30-190 miles + Refraction
- Targets 500m behind, 75m below with 5m to 100m separation
- 4 hours on station
- ECM Support: Radom, 2Kw, 2’ x 3’ shelf, 100lb
- Low RCS composite propellers available

Multi-Engine Turbocharged Piston Powered Aircraft Meets Mission Requirements
System Components (1 of 3)

• Retro reflector, Luneburg lens

COTS Reflectors with Traceable Calibration Data
System Components (2 of 3)

• Powered Target Extension Retraction Mechanism
• COTS Game Fishing Tackle
• 2500 Yards of 80lb line
  – $1m^2$ target = 6lb of drag
• Mounted in the cabin
• Line run thru tubing to tail and wing tips

US-Made, COTS 28v DC Reel Compatible with Aircraft Power System
System Components (3 of 3)

• COTS Airframe: Cessna T310R
  – 200 knots @ 25k feet towing three 0.5m² targets
  – 200 amps DC @ 28V
  – 1000lb Useful Load
  – Panel space for UFH/FM radios
  – Radom with ECM equipment space just aft

Cessna T310R Meets Mission Profile with Reasonable Acquisition Cost
Summary

• An airborne system towing multiple small RCS targets creates a ‘radar range’ in the sky
• Supports direct comparison of tracking performance between competitive systems
• Fills possible void between lab test and system analysis of air defense radar systems
• Assembled from off the shelf components
• Low direct operating cost
• Usable across multiple programs

Realistic Testing at a Reasonable Cost
Questions
Thank you

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