NEED FOR COMPOSITES REPLACEMENT
- Lockheed adapted L-188 Electra turbo prop aircraft to produce ASW surveillance aircraft (P3) in 1962.
- Significant airframe corrosion experienced by P-3C aircraft fleet required expensive part replacement program to keep fleet in service.
- 2002- P-3 Service Life Extension Program (SLEP) developed to extend operational service life of aircraft inventory.
- Multi-mission Maritime Aircraft (MMA) replacement start date not until 2012, with total replacement targeted for 2020.
- Until that date, depot maintenance will continue for years to come.

ORION P3 AIRCRAFT
- Significant Corrosion Issues
- Lockheed adapted L-188 Electra turbo prop aircraft to produce ASW surveillance aircraft (P3) in 1962.
- P-3C aircraft fleet experienced significant airframe corrosion.

OPPORTUNITIES FOR COMPOSITES
- Leverage ONR funded design, processing, materials, and prototyping technologies to develop flight worthy replacement article(s) for the P3 surveillance aircraft.
- Produce test article for flight testing of trailing edge panel.
- Apply lessons learned from program towards design of new aircraft.
- P3 Trailing Edge Flap
- 2002- P-3 Service Life Extension Program (SLEP) developed to extend operational service life of aircraft inventory.
- Multi-mission Maritime Aircraft (MMA) replacement start date not until 2012, with total replacement targeted for 2020.
- Until that date, depot maintenance will continue for years to come.

DEVELOPMENT TEAM
- LEVERAGE ONR FUNDED DESIGN, PROCESSING, MATERIALS, AND PROTOTYPING TECHNOLOGIES TO DEVELOP FLIGHT WORTHY REPLACEMENT ARTICLE(S) FOR THE P3 SURVEILLANCE AIRCRAFT.
- PRODUCE TEST ARTICLE FOR FLIGHT TESTING OF TRAILING EDGE PANEL.
- APPLY LESSONS LEARNED FROM PROGRAM TOWARDS DESIGN OF NEW AIRCRAFT.

REVERSE ENGINEERED
- FARO Arm Scanned Part into CATIA
- Design Drawings Reverse Engineering
- Generate CAD Model
- Apply Constraints
  - Relax to substructure
  - Substructure: Moments and panel
- Apply Loads
  - Installation Stress
  - Pressure: 0.3 psi
  - Maintenance Personnel (MRI)
  - Terminal CT, Mesh (0.001"
- Composite Design
  - CATIA Composite Design (CF/CPK)
  - CATIA Advanced Meshing Tools (MS, FEM)
  - Generative Structural Analysis (ISA)
  - SimDesigner Enterprise (Patran/Nastran)
  - Laminate Modeler (Patran) and FiberSIM
  - ANSYS for CATIA (FEM) with VCCT
  - Virtual Crack Closure Technology developed by Boeing

Material Input
- Lamina material selection
- Lamina thickness/esi properties

Baseline Aluminum Analysis
- Design Requirements
- Maintenance Requirements
- Material Property Data (Hexcel)
- UD-COM CDS Software
- UD-COM Materials Testing

Iterative Design Loop for Optimization
ACKNOWLEDGEMENTS

This work is supported by the Office of Naval Research through the Advanced Materials Intelligent Processing Center.

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