



Defense-Wide Manufacturing Science & Technology (DMS&T) Program



Automated Non-Destructive Evaluation (NDE) Analysis of Composite Ultrasonic Inspection Data for Manufacturing Quality Control

PROBLEM / OBJECTIVE

- 100% ultrasonic inspection is required for JSF composite component acceptance
- Consistent inspector monitoring of Non-Destructive Evaluation (NDE) of composite components creates potential bottleneck in JSF full rate production line

APPROACH / BENEFITS

Objective

- Flag composite component defects for disposition with minimal human involvement
- Automated NDE technology tailorable to different composite components

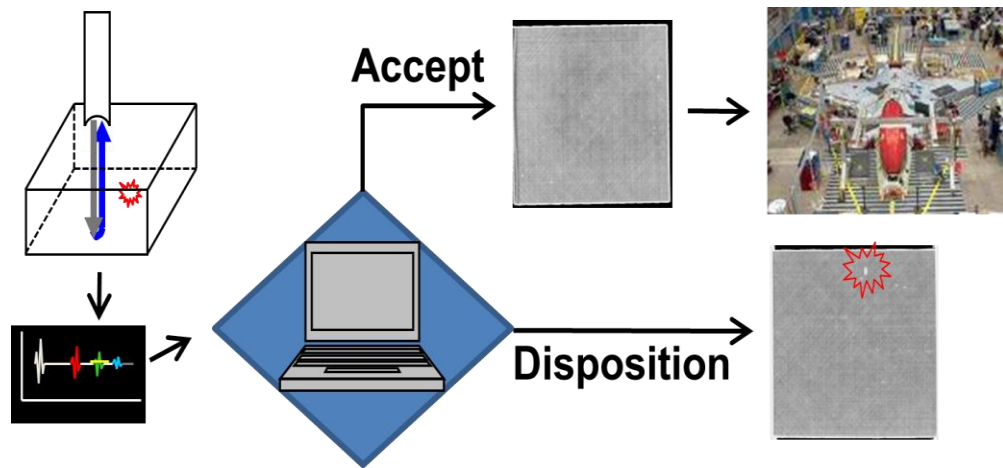
Approach

- Develop an understanding of how human inspectors interpret the inspection data
- Determine raw data features produced by defects in the OMCs
- Develop automated routines to ID those raw data features
- Design and fabricate specimens with known defects
- Demonstrate analysis capability in a functional test (lab scale)
- Validate analysis in industrial setting

Expected Benefits and Warfighter Impact

- Eliminates production rate constraints due to inspection requirements for part acceptance
- Decreases inspection time
- Removal of production bottleneck for advanced composites
- Accelerated acceptance of production components
- Minimizes human inspector interaction

- Increased inspection repeatability/reliability
- Decrease manual analysis burden
- Initial Beneficiary: JSF
- Secondary Beneficiary: legacy systems/USAF, Army, Navy, Marines
- Benefits:
 - Increased confidence that part meets spec
 - Cycle time reduction: 8hr/part
 - 5000 parts = 40,000hr
 - ROI=3.7
 - 5000 parts = \$7.5M



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