



412th Test Wing



War-Winning Capabilities ... On Time, On Cost

Testing Status Advanced Sensor Reversible Attachment Technology

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Integrity - Service - Excellence



Overview



- Introduction
- Background
- Test Objectives
- Test Activities
- Observations

—This material is based upon work supported by the Test Resource Management Center (TRMC) Test and Evaluation/Science & Technology (T&E/S&T) Program through the U.S. Army Program Executive Office for Simulation, Training and Instrumentation (PEO STRI) under Contract No. W900KK-11-C-0023.

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Introduction



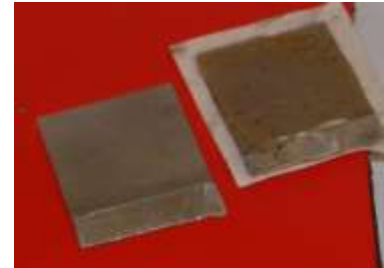
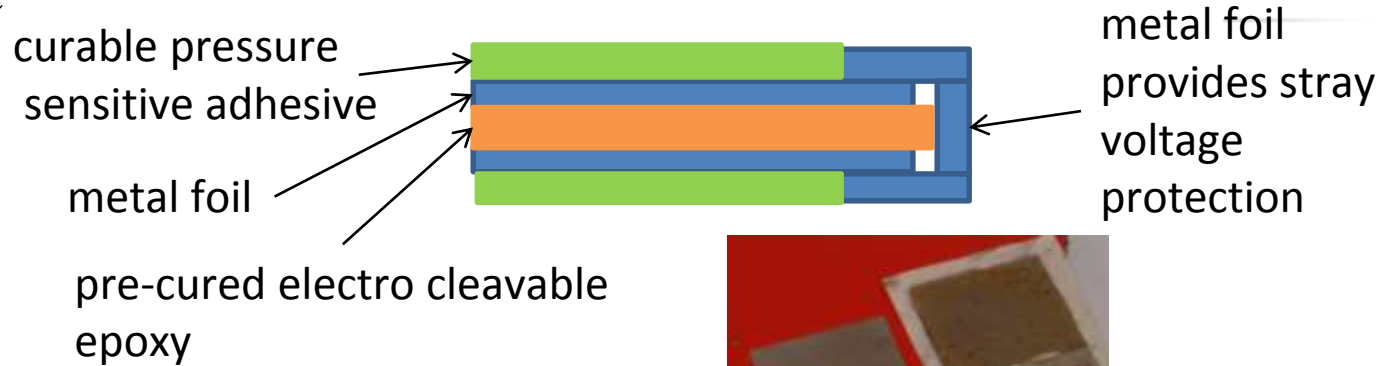
- Electro-cleavable adhesive developed in 1998
- Advanced Sensor Reversible Attachment Technology (ASRAT) developed curable pressure sensitive adhesive (PSA) in 2014
- ASRAT combines both adhesives to develop a new electrically releasing adhesive mechanism
 - Simplifies bonding process
 - Facilitates faster surface restoration
 - Usable over a broader range of temperatures
 - Suitable for use on wide range of aircraft, vehicles and substrates
 - Modifies foil patch for lightning/static discharge dissipation



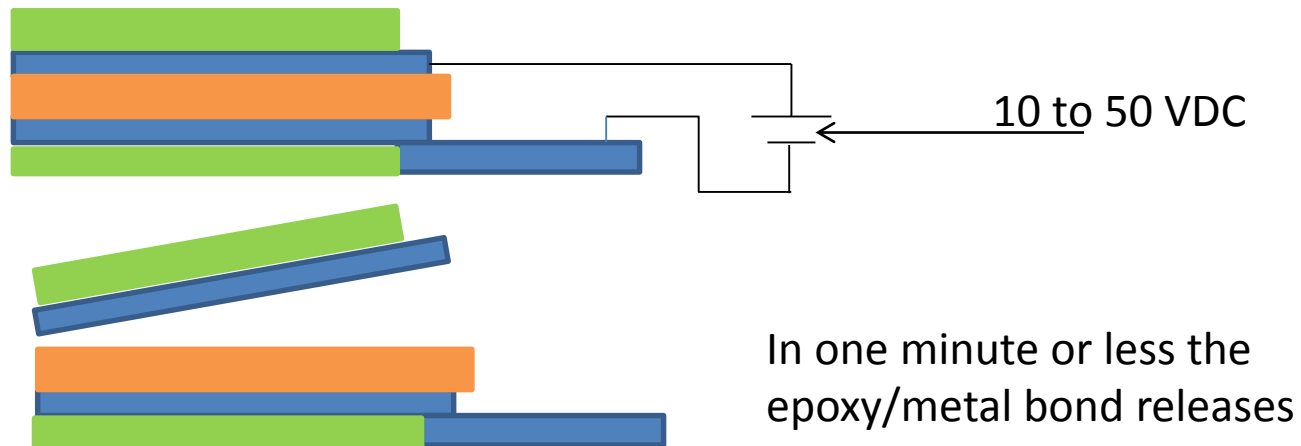
Background



Concept



De-bonding sequence





Test Objectives



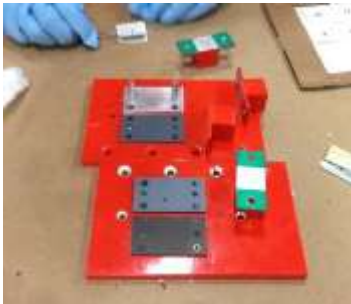
- Demonstrate non-intrusive nature of technology
 - Bonding process
 - Curing
 - Integrity of bond throughout a test mission
 - Ease of removal and surface restoration



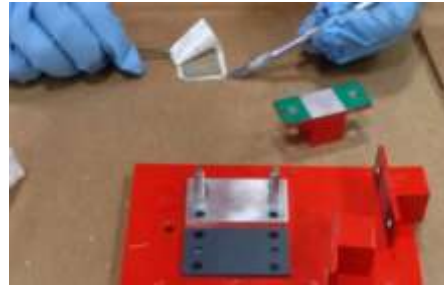
Test Activities



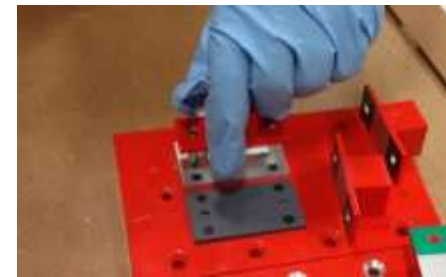
Bonding Process



surfaces cleaned and dry (acetone or alcohol)



check adhesive



apply adhesive



press hard to force adhesive to bubble out the edges



room temp cure 12 hours



PSA test:
blocks installed with carrier metal plate in vertical position



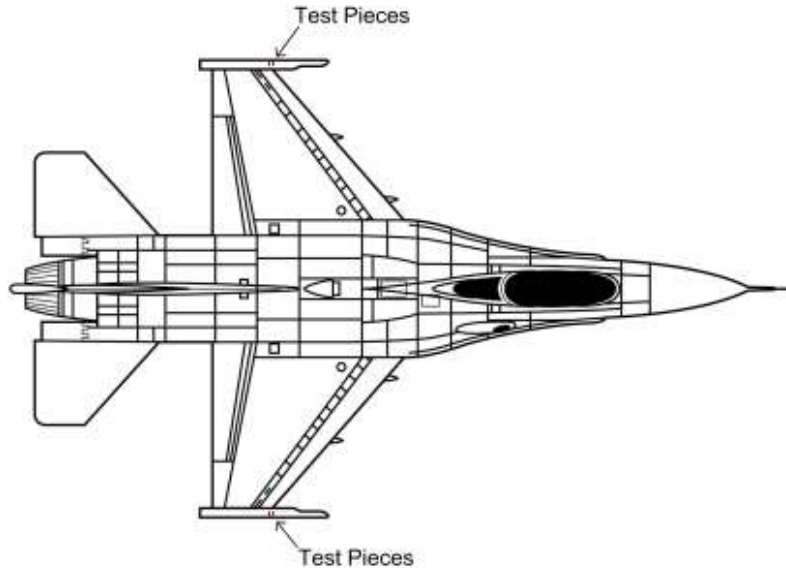
tension pull test to validate batch



Test Activities

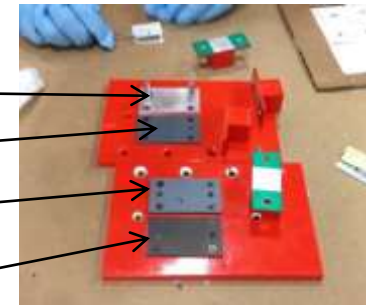


- Bond integrity in flight



- Test article bond configuration

- Unpainted aluminum to unpainted aluminum
- Unpainted aluminum to painted aluminum
- Unpainted aluminum to painted composite
- Unpainted aluminum to unpainted composite





Test Activities



- De-bonding process evaluation

[..\..\ASRAT\ASRAT debond process.mp4](#)



Observations



- Bond failure prior to start of flight testing - unpainted aluminum to unpainted composite
- Sixteen flights completed with remaining test pieces
 - Exposed to a wide range of temperatures
 - Load factor: 1 to 9 Gs
 - No failures
- Bonding process - satisfactory (simple and effective)
- Curing time -12 hours at room temperature
- De-bonding process - satisfactory (simple and effective)

