Non-Drip Brush Technology for OML Corrosion Remediation and Large area Anodizing

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AFCPCO Corrosion & Non-Chrome TIM

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The technology

Mobile, non-drip, fast, on-aircraft repair

Technology – non-drip plate, anodize, corrosion removal

CORRDESA

READINESS

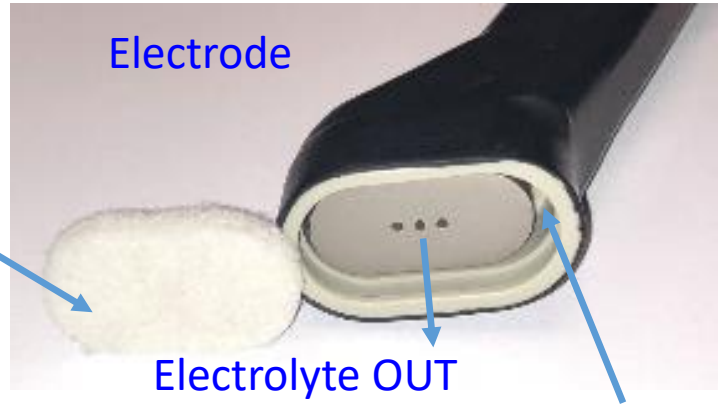
This P-8 flew into depot in the morning, it was on patrol in the afternoon

Non-drip technology

- Closed-loop electrolyte system
- Electrolyte in temperature-controlled bath
- Electrolyte is pumped into plating tool and air + electrolyte sucked back to tank

Electrolyte and air flows balance so pad is wet but does not drip in any orientation

Non-drip Dalistick tool, platinized Ti anode



Deployed Systems

Mobile, non-drip, fast, on-aircraft repair

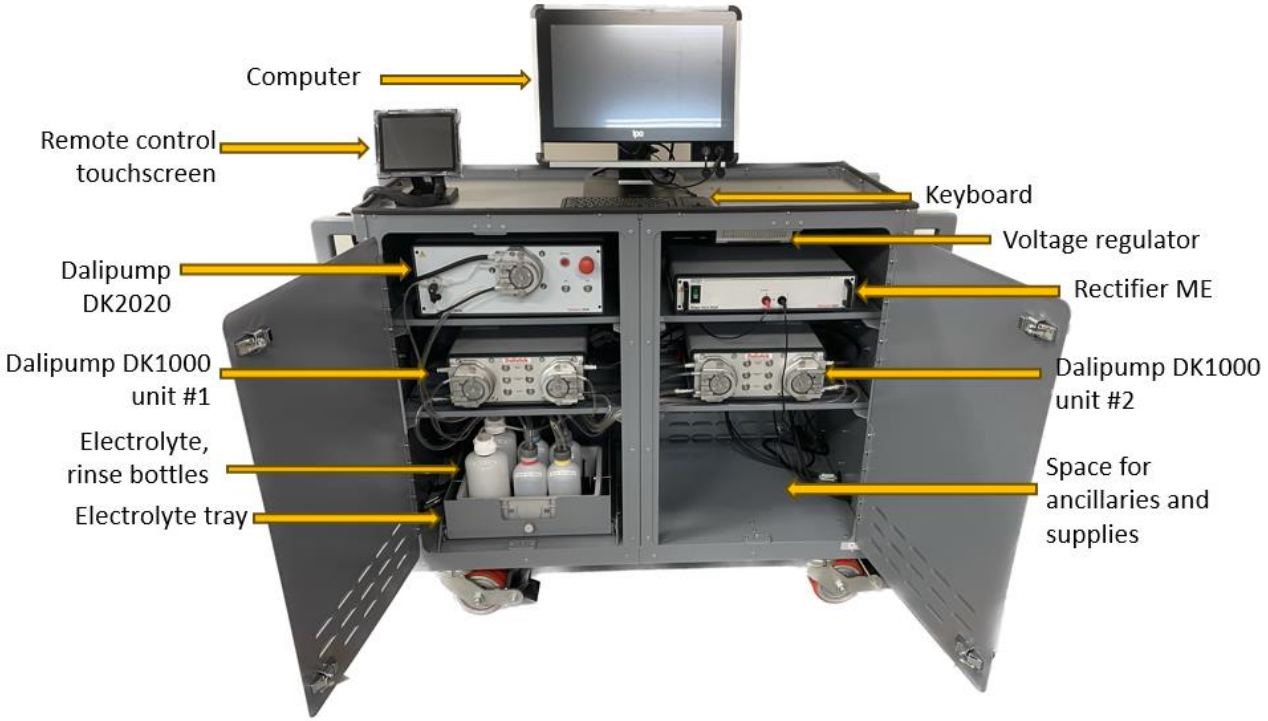
F-35 Ground Support Equipment

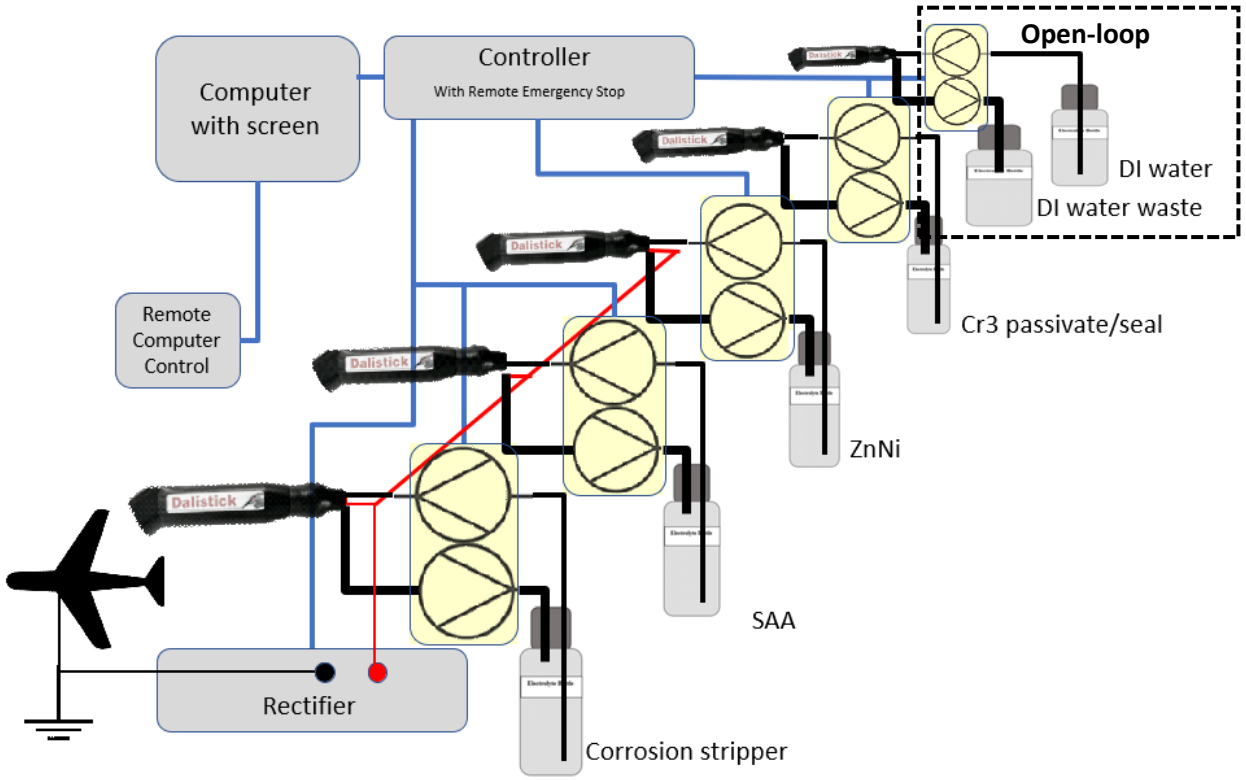
Distribution A: Lockheed-Martin approved for public release; distribution is unlimited.

- GSE for repair of Cd and ZnNi electroplating on F-35 squadrons around the world
- Including use topside on aircraft and helicopter carriers
- 52 units delivered to date

- ✓ Designed to be used on flight line or shipboard
- ✓ Tie Downs
- ✓ Brake hold on 15° slope
- ✓ No tipping at 15° with side force
- ✓ Aerospace finish for corrosion control
  - ➢ No chromates
- ✓ 20 ft tool cable for ATEX compliance
- ✓ 50 ft ground return from a/c
- ✓ Absolutely no FOD
  - ➢ All fasteners, etc. captured or Loctite

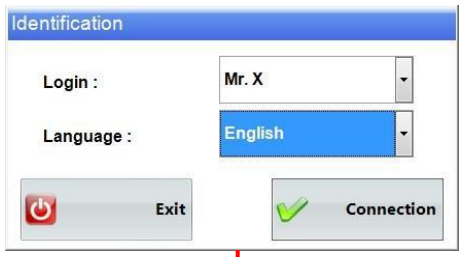
U-2 on-aircraft repair of anodize and fasteners

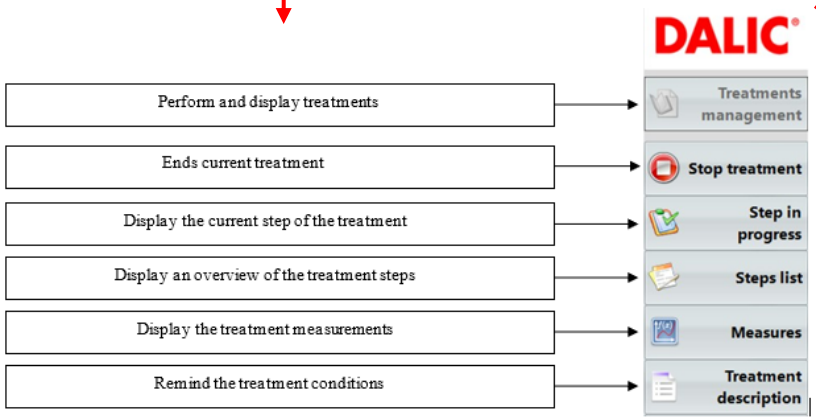


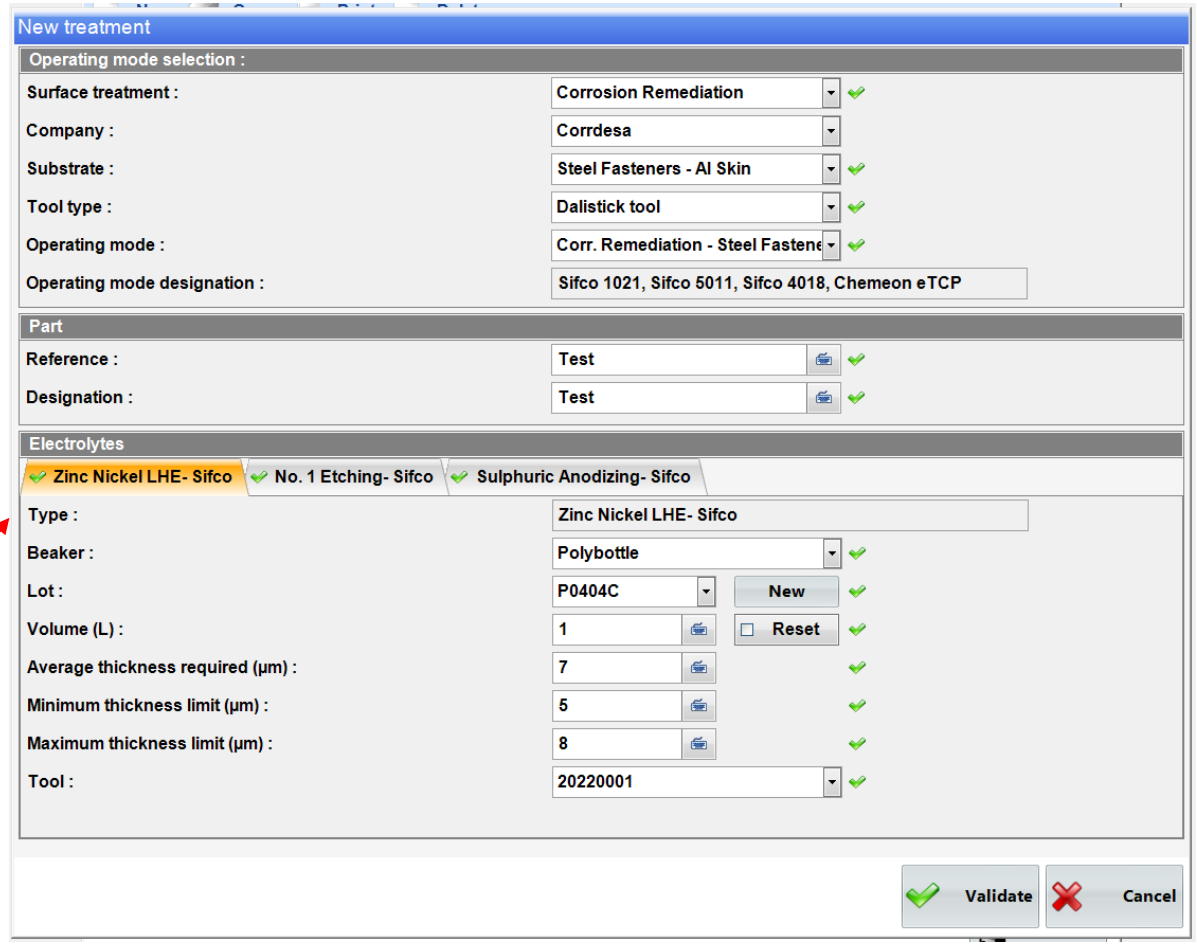


- Corrosion and paint damage
- Requires repair of anodize and replating of fastener heads – 5 tools
- Two COTS computerized systems in specialized cart being supplied to Beale AFB

Computer Interface for Safe Operation and Maintenance of the System

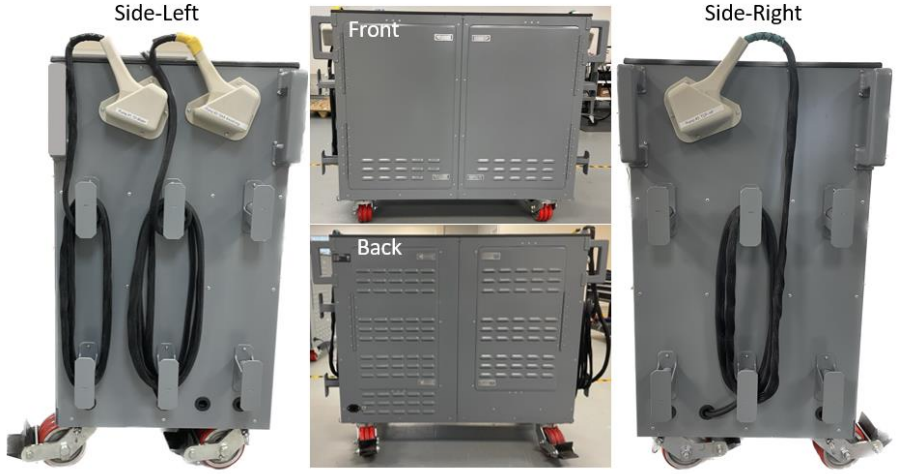






User interface to access and control the pre-loaded “Corrosion Remediation” repair program.

P-8 Poseidon Brush SAA



Static port – demo repair

Engine Inlet: Extensive pitting
ZnNi for smooth coating

Trailing edges of wing leading edge slats

- Exfoliation
- Raked wing tip anodize damage

C-5 Challenges

Corrosion removal, fastener replating, anodize repair – **at scale**

Interim Summary – Non-drip, Mobile Capabilities

- Small, commercial tool, 20+ years, MROs globally
  - Plating (Cd, ZnNi, etc)
  - Anodizing (SAA, Sulfuric Acid Anodize)
- Electrolytic corrosion removal
  - 5-step fastener corrosion remediation process
  - Small tool, but okay for U-2
- The Challenge is SCALING-UP

Process	Small scale	Large scale
SAA Sulfuric Acid Anodize	✓	✓
Fastener Corrosion Remediation	✓	In progress

C-5 Fastener Corrosion Remediation

Fastener corrosion remediation

C-5 corroded wing fasteners

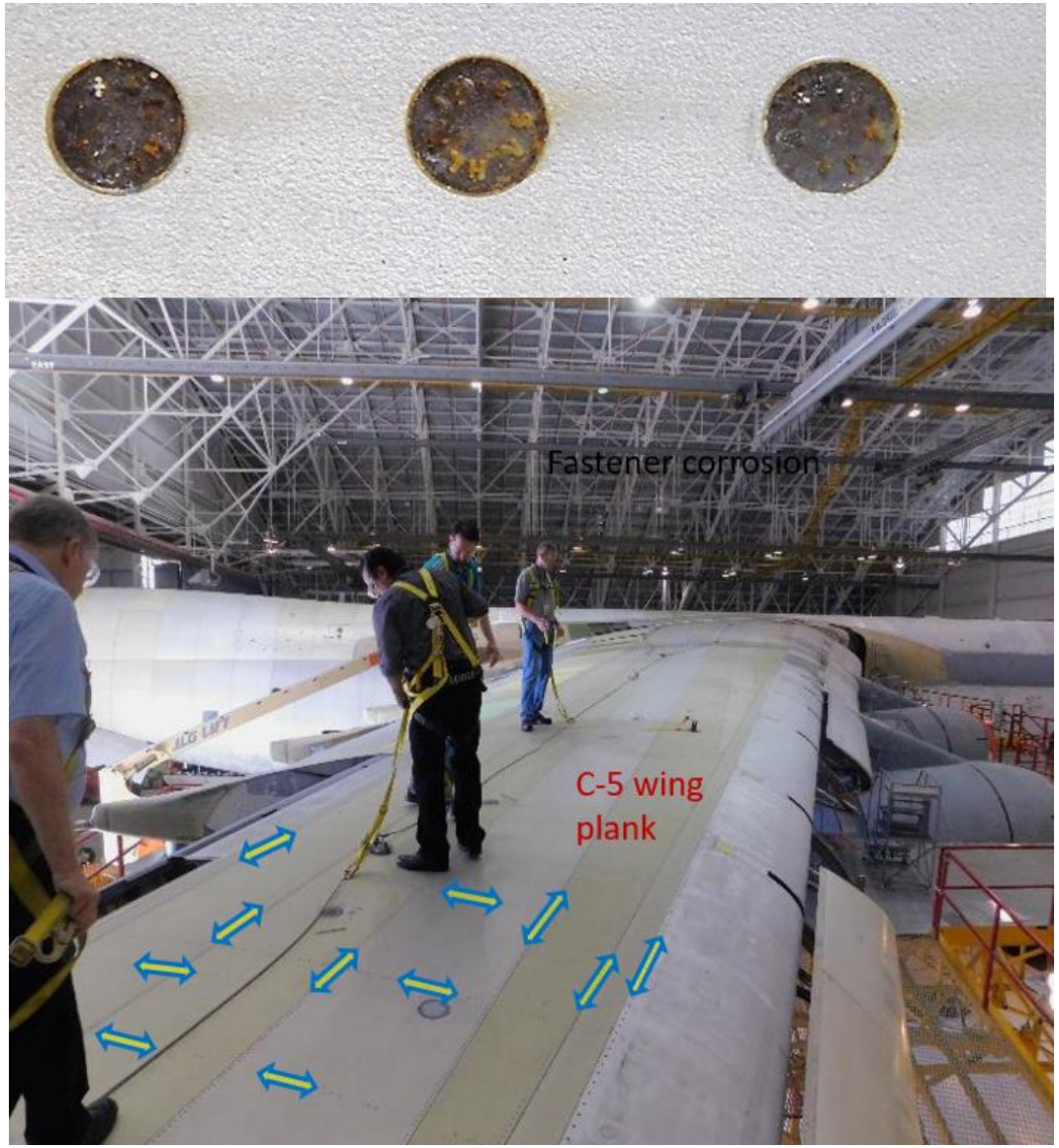
Problem - Corroded wing steel fasteners

- cannot be removed without endangering structure
- Surrounding anodize layer often damaged

Solution

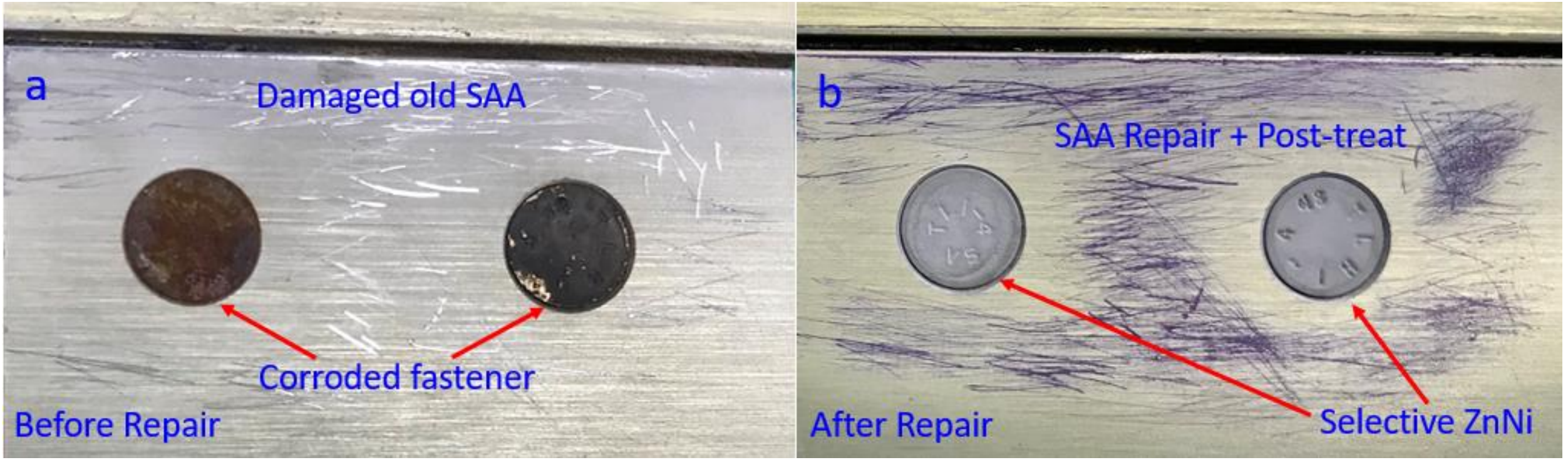
- Strip fastener corrosion and any Cd
- Replate fastener with LHE ZnNi
- Re-anodize aluminum
- Passivate coating, seal anodize

Requires significantly larger tooling



A typical aircraft wing Fastener corrosion repair strategy

- Selectively removes Cd and Corrosion products without damaging the surrounding anodized Al
- No Cadmium and chromate dust
- Thicker corrosion takes longer to strip/clean
- Fastener head repair using ZnNi LHE plating
- Old SAA repair with new SAA



Picture above uses a colored eTCP to show anodize repair

C-5 Anodize Repairs - Demonstration

Remediation of floor anodize

C-5 aircraft floor patches

Problem

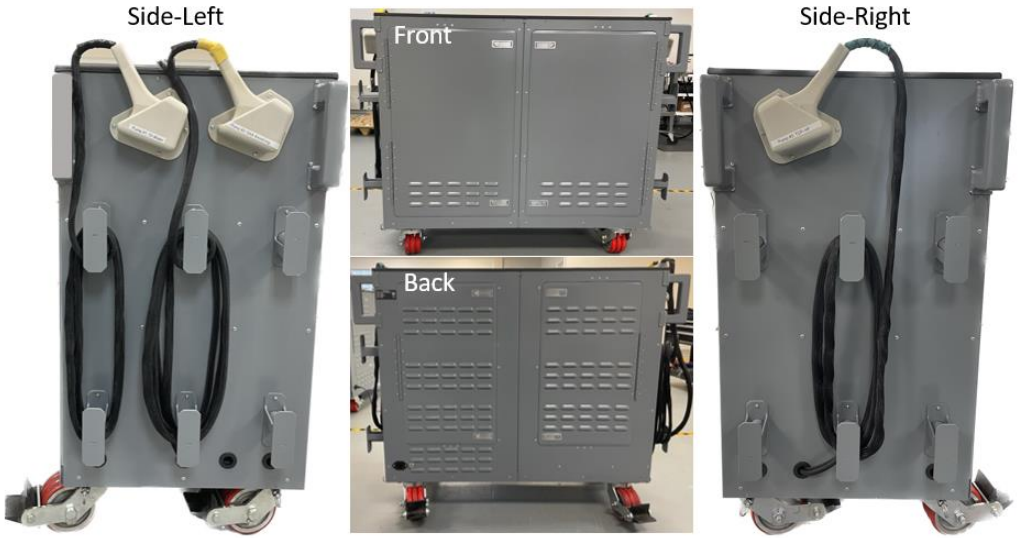
- Preparation for patch repair damages surrounding anodize

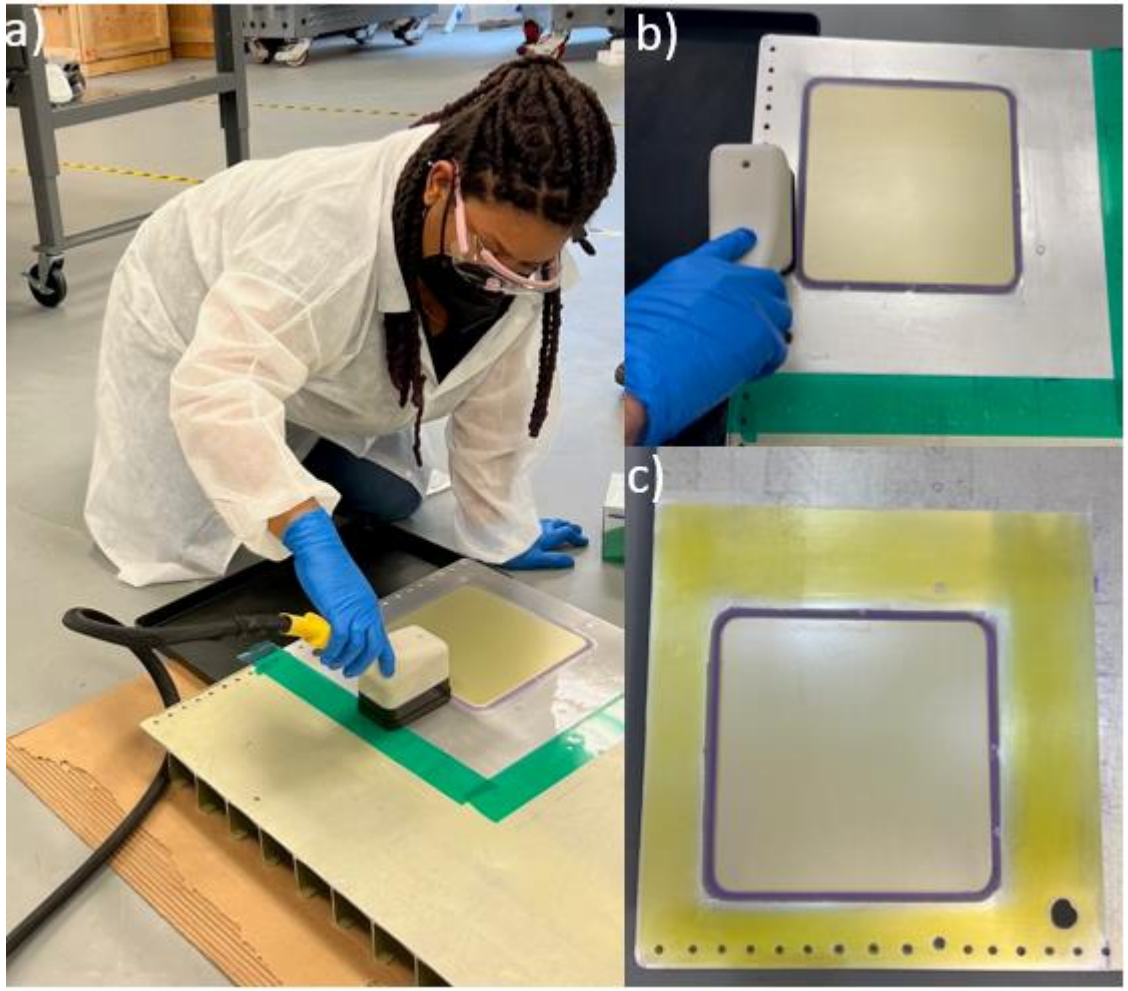
Solution

- Non-drip anodize surrounding aluminum after patch repair
- Rinse & seal anodize

Requires significantly larger tooling

SAA - Larger, non-drip tool



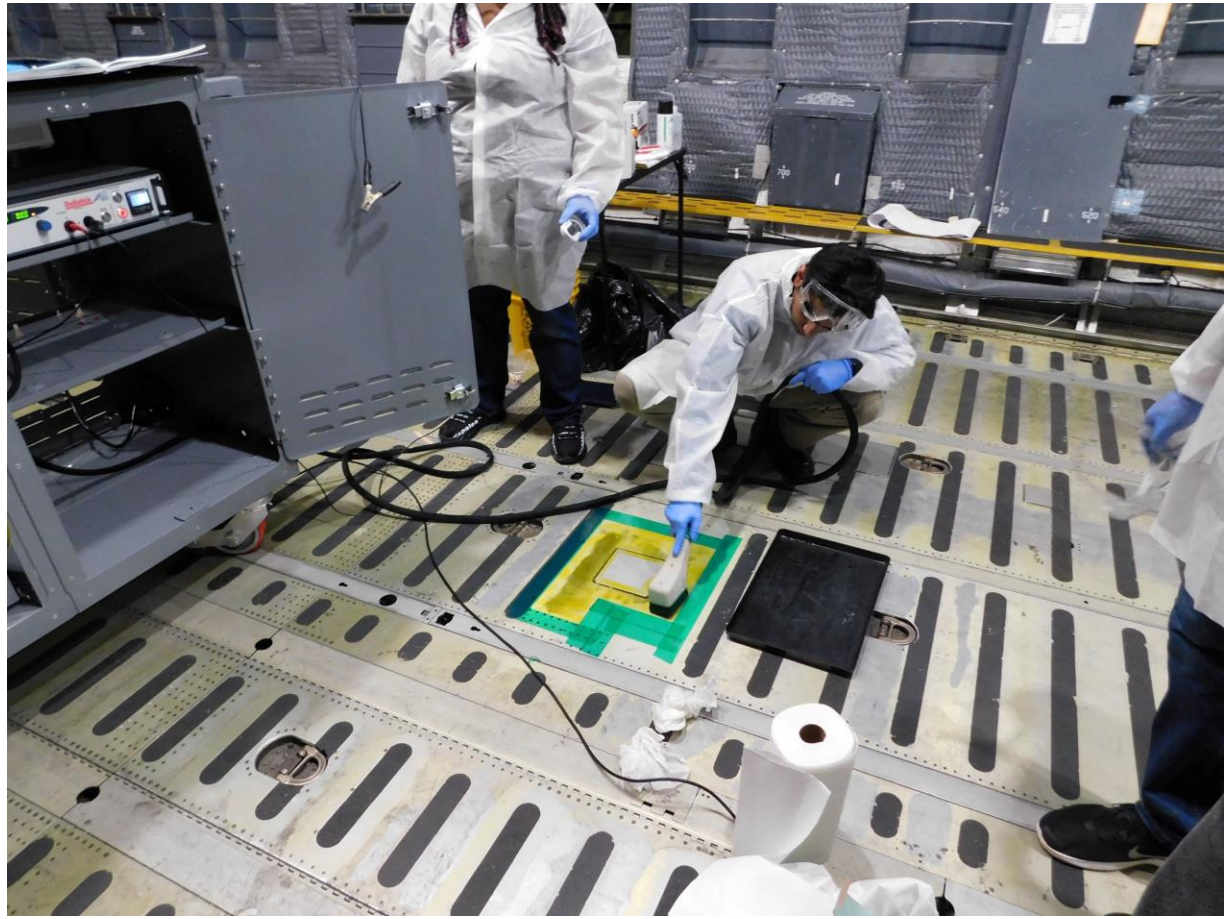


On-plane Demonstration – 20th March 2024

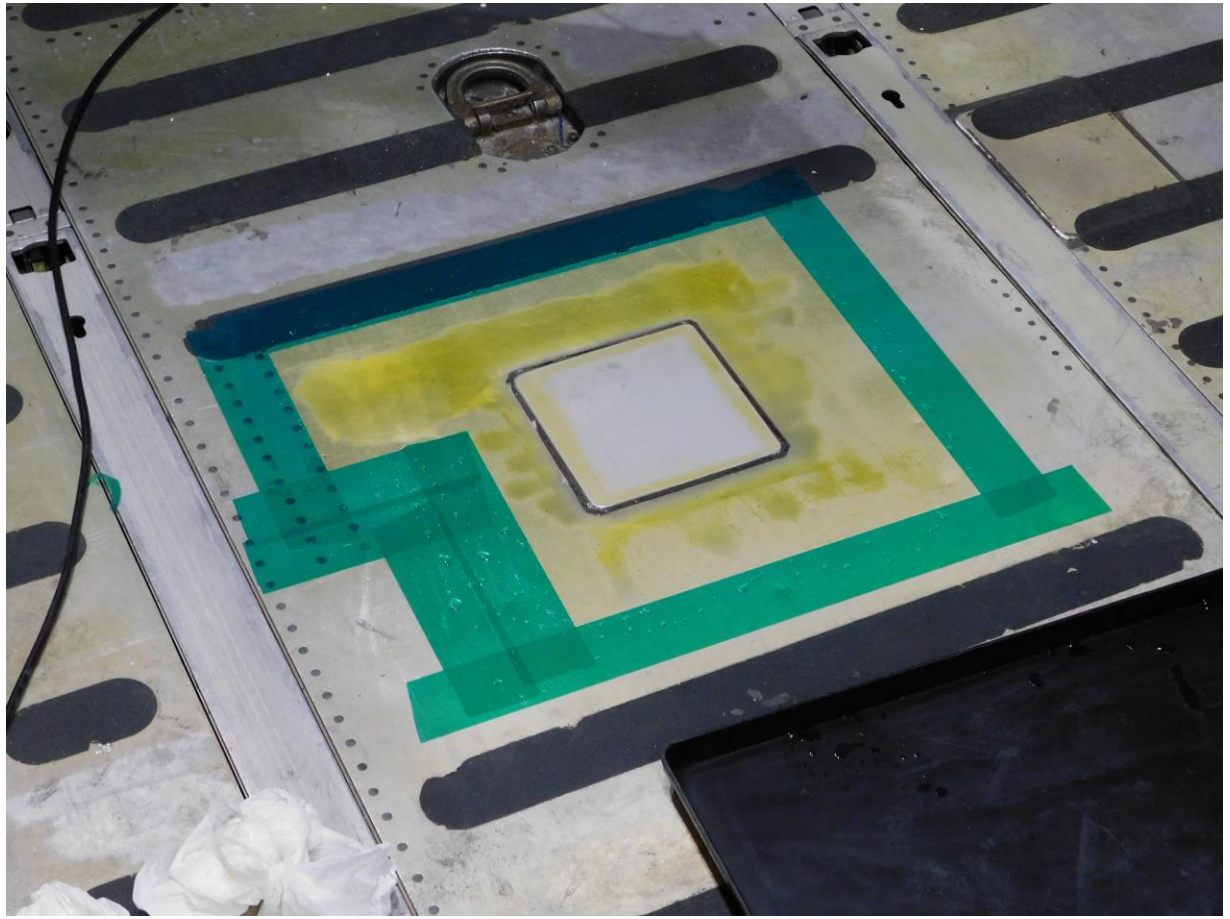
Surface preparation

Anodize

On-plane Demonstration

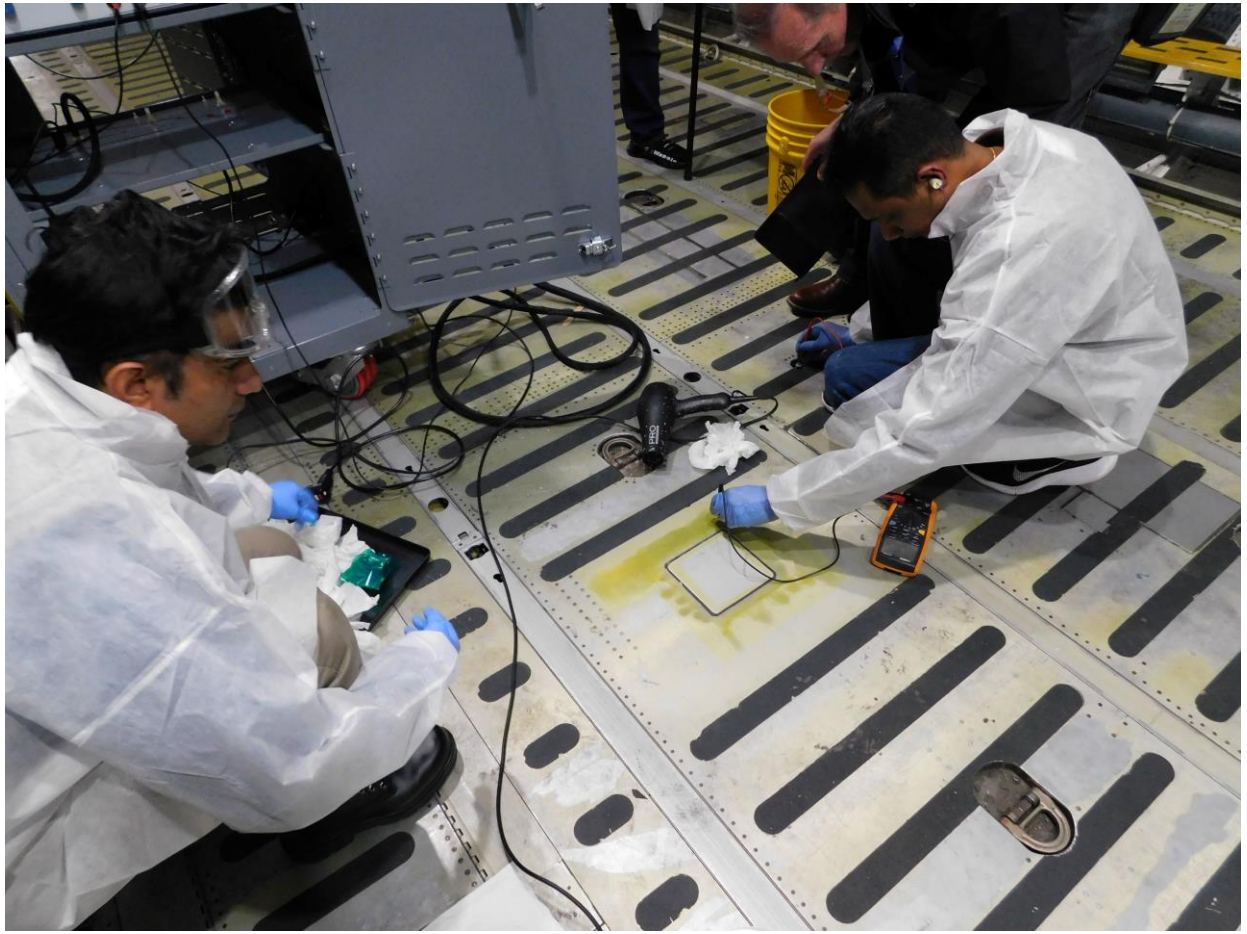


Seal



Repair complete

On-plane Demonstration



Check integrity of repair

Project Complete

- Establish deployment path
- Modify Technical Orders
- Acquisition of equipment

Thank You.
Questions?

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Come and see me at the table